The Newspaper of Information Systems Management
April 5, 1993. Vol. 27, No. 14, 124 Pages. $6/Copy, $48/Year

COMPUTERWORLD

Inside

OPERATING SYSTEMS
SunSoft's Solaris Developers Conference sets the stage for a slew of announcements, including a May ship date for Solaris on Intel-based PCs and plans to port Solaris to IBM's PowerPC chip. *Page 12.* Do users really need MS-DOS 6.0? A test drive indicates its utilities may help nonexpert users but mainly when the product is delivered with a new system rather than as an upgrade. *Page 39*

MAINFRAMES
In a bid to move customers gracefully to open systems, **Unisys** this week will roll out new A series hardware and software with added Unix integration capabilities. *Page 2*

COMPUTER CRIME
The Justice Department proposes new sentencing guidelines that should toughen penalties for convicted computer criminals. *Page 20.* A judge with a sense of humor fines a computer 60M bytes for contempt of court *Page 2*

TCP/IP barriers falling

By Elisabeth Horwitt
COLUMBUS, OHIO

The official TCP/IP standards body began moving aggressively last week toward knocking down the last remaining barriers to the protocol's full adoption by the multinational, corporate business community.

Moves by the Internet Engineering Task Force and International Standards Organization to work together on future internetworking standards were of particular promise to users. They follow efforts by various workgroups to address specific Transmission Control Protocol/Internet Protocol shortcomings.

Task force bits

The Internet Engineering Task Force first met in 1986. Attendance jumped from 112 people in 1989 to 600 at last week's meeting.

The TCP/IP market was estimated at about $2 billion in 1992, according to Lyman Chapin, chairman of the Internet Advisory Board.

The two standards bodies also discussed the possibility of merging the best features of the ISO's Open Systems Interconnect and TCP/IP into a single, international internetworking standard.

"We want to have one focus of internetworking protocols from now on; no more war," said Lyman Chapin, chairman of the Internet Advisory Board.

As such, the IETF meeting provided good evidence of TCP/IP's progress from a down-and-dirty network engineer's protocol to a mature standard that corporate information systems departments can trust with business-critical applications.

TCP/IP, *page 8*

Users push hard for EDI, X.400 integration

By Lynda Radosevich

Users are clamoring for vendor assistance in merging electronic data interchange and messaging technologies onto a single network, a move that would provide them with better tracking and security than they get with EDI services today.

Large companies are also looking to exchange electronic business documents and send electronic mail across one standards-based messaging network because they want to slash the hefty cost of maintaining separate network resources.

The technologies that will let them achieve these goals are the X.400 protocol for messaging and its corresponding X.435 EDI component. However, X.435 translation software and EDI value-added network gateway and transport services must emerge before users will be satisfied.

Oiling the gears

Behind the push to spur vendors to action is the Petroleum Industry Data Exchange, whose members include Texaco, Inc., Chevron Corp.,

EDI, *page 8*

Growing support options challenge PC planners

By Kim S. Nash and Christopher Lindquist

Suddenly, PC software support is not so simple anymore.

A barrel of new options has spilled into the market in recent months as users demand more attentive service and vendors seek to make money from what has typically been a money-losing proposition. The result: Users will now have to pay for some services they once got for free, and they will have to do more homework before signing support contracts.

However, many more options are now available. Among the recent changes in support channels are the following:

• Borland International, Inc. confirmed last week that it will outsource end-user support for 12 "nonactive" applications that are no

Support options, *page 6*

Travel firms rush to avert system cutoff

Former Confirm partners argue as deadline nears

By Mark Hsiper
CHICAGO

■ With just six weeks left before outsourcer AMR Corp. terminates a reservation processing agreement, Hilton Hotels Corp. and Budget Rent A Car Corp. have yet to make alternate arrangements.

AMR is scheduled to pull the plug on the reservation system, called North, on May 15. As of last week, it appeared unlikely that Beverly Hills, Calif.-based Hilton and Budget, based here, would have processing arrangements in place when the contract to operate North ends.

Bob Aprati, general counsel at Budget, declined to speculate on the firm's options if the contract is not extended or a replacement service is not found in time. However, he said, "we don't believe" that operations will grind to a halt.

Hilton declined requests for interviews. A spokeswoman said officials there "do not feel comfortable at this date in talking about the details."

Budget and Hilton's quandary appears to mark the latest fallout from the failed Confirm reservation project, which had called for AMR to develop a state-of-the-art system for Hilton, Budget and Marriott Corp.

Confirm was to have provided Hilton and Budget with far greater functionality than the aging North system, which is more than 20

Travel firms, *page 16*

Advice plentiful for IBM CEO

▶ As Louis V. Gerstner Jr. takes over as IBM chairman, he faces a complex series of decisions about where to compete and which product lines to emphasize. *Computerworld* interviewed analysts and users last week to find out what they think the challenges IBM faces are in each of its major markets and what strategies it needs to employ to get back on its feet. The consensus: IBM has more strengths than some people think, but it needs to eliminate corporate deadwood to take advantage of them. Pages 14 and 33.

Louis V. Gerstner Jr.

will earn up to $3.5 million this year as the new head of IBM, nearly three times as much as his predecessor, John Akers

Gerstner gets approval

Users expect change from IBM's new CEO, but say the appointment will have little effect on buying plans.

RATINGS BASED ON 1-TO-5 SCALE, WHERE 1 IS COMPLETE DISAGREEMENT AND 5 IS COMPLETE AGREEMENT

AVERAGE RATING

3.7	Think he'll make dramatic changes.
3.4	Like the choice of Gerstner.
2.0	Choice is important to purchasing plans.

Source: Computerworld Database Division survey of 181 users

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CLIENT/SERVER

While the idea of client/server projects may cause visions of development tools to dance in PC zealots' heads, the real key to success lies in planning and interactive teamwork. Seasoned IS managers share their advice on winning with client/server. *Page 75.* **IBM** "downsizes" CICS transaction processing to OS/2-based client/server environments, with AIX servers to follow in June. *Page 4*

LANs

Apple's push to install Macintoshes on more corporate desktops has been hampered by past difficulties in connecting the Macintosh to PC-based LANs. However, all the major LAN vendors, including **Novell, Microsoft** and **Banyan**, have recently announced plans for improved Macintosh support on corporate LANs. *Page 47*

WORK FLOW AND IMAGING

Imaging software may have dropped in price, but you still have to pay $5,000 to $10,000 per seat to get an extensible, customizable system. *Page 81.* As for the traditional systems from **IBM, Wang** and **FileNet**, Buyers' Scorecard respondents rated them high in user satisfaction. *Page 90.* FileNet Corp. describes a new, object-oriented, general-purpose work-flow system for availability in early 1994. *Page 10.* **The Securities and Exchange Commission**'s electronic filing system shifts into high gear. *Page 59*

PC SOFTWARE

Managers don't use PCs as much as they should because current software doesn't support their three primary tasks: coordinating groups, communicating ideas and controlling money. An author argues that what would be on target is software that takes the best features from personal information managers, project management tools, spreadsheets and bulletin boards. *Page 93.* **Microsoft**'s Bill Gates outlines modest expectations for **Windows NT** shipments and reveals plans for a single programming interface for Windows, the **Apple** Macintosh and Unix. *Page 6*

FACE TO FACE

As SAS Institute prepares its biggest product rollout ever (*page 24*), founder **James Goodnight** talks about how his company has survived the ups and downs of 17 years in the industry. Goodnight may be the only major software company head to continue to be the lead programmer on a company product. *Page 113*

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Unisys to augment A series

By Thomas Hoffman
BLUEBELL, PA

■ In an effort to forestall the migration of its A series mainframe customers to cheaper distributed systems, Unisys Corp. this week will introduce several models and related software components designed to provide further integration between the mainframe environment and Unix platforms.

Informed sources said Unisys will introduce an A-7 midrange mainframe machine designed to run on the vendor's proprietary Single Chip A Series Mainframe Processor chip. The A-7 package will include a Unisys application called the Cooperative Computing Environment (CCE), which will allow A series customers to place a Unix or IBM OS/2 workstation or server in a parallel processing mode with A series machines.

CCE enables users to integrate A series and Unix applications with each other, said Thomas Willmott, vice president of the Aberdeen Group, a Boston consultancy. It permits users to create single-image applications using key components of three primary operating environments, including the A series MCP/AS, IBM's OS/2 and Unix.

For example, primary processing, monitoring and database management of an on-line transaction processing application could reside in the A series domain, while the user interface portion of the application could be hosted by a graphical user interface in Unix or OS/2 environments.

In addition, Willmott said, Unisys will announce that Oracle Corp.'s SQL Star and SQL Net software packages will be configured to run on A series platforms.

Willmott said Unisys' A series line of computers has been a surprisingly strong revenue generator during the past year, given the moribund state of the mainframe industry overall. Pointing to the $338 million A series contract that Unisys won last year with the U.S. General Services Administration, he estimated that Unisys A series revenue alone was roughly $1.9 billion, or 23% of the vendor's $8.4 billion in total revenue last year.

Frank G. Brandenberg, vice president and general manager of Unisys' Computer Systems Group, stated earlier this year that the vendor's A series revenue grew 20% from 1991 to 1992, due in large part to customer demand for the high-end A-19 mainframe and last year's A-11 machine.

However, Willmott and other analysts cautioned that the A series will eventually face the price/performance and portability challenges confronting other mainframe platforms, such as IBM's MVS environment.

Big money

In 1992, Unisys landed approximately 150 new A series mainframe customers solely through an alliance with Information Technology, Inc., a software developer that provided Unisys with more than $100 million in new revenue, according to Jon Bell, Unisys' chief technology officer. Unisys' combined 1992 mainframe revenue was roughly $3.5 billion — or 42% — of the firm's $8.4 billion revenue total.

Rogue computer fined for contempt

By Mitch Betts
MIAMI

In at least one jurisdiction, that modern-day excuse, "It's the computer's fault," is no longer acceptable.

A federal bankruptcy judge with a sense of humor has cited a NationsBank Corp. computer in contempt of court and fined it 60M bytes of memory for sending erroneous bills.

The case began late last year when the NationsBank computer sent a dunning letter to John and Margaret Vivian in Miami Lakes, Fla., even though the bankruptcy court had excused them from paying the debt.

The bank apologized, "proceeded to appropriately chastise their computer and directed it not to send any more notices to the Vivians," Judge A. Jay Cristol wrote.

But "the rampage of the rogue computer" continued, Cristol said, as it sent the Vivians dunning notices for the next two months. Although the bills showed no balance due, Cristol said, the Vivians were upset.

They wrote a scathing letter to the court asking, "Why can't you or your court get these continuing and very annoying letters STOPPED?" and threatened to take the matter to a federal judge who is a family friend.

Judge Cristol said it was this letter — which "has truly established, beyond all reasonable doubt, that Mr. and Mrs. Vivian have no sense of humor" — that led to the Dec. 8 contempt citation, which was just recently published.

Accordingly, the judge fined the NationsBank computer "50M bytes of hard drive memory and 10M bytes of random-access memory." NationsBank's attorneys responded by sending the court a hard disk and nine computer chips that exceeded the amount of the fine.

Court documents indicated that the defendant was an IBM microcomputer (model unspecified) linked to a Novell, Inc. local-area network. The offending notices were generated by a corrupt database file.

Corrections

- An item in the March 1 issue should have said KC Branscomb left Intellicorp to join Lotus Development Corp.
- A story in the March 15 issue misspelled the name of Steve Gardner, the former head of Groupe Bull's Integris unit.
- An article in the March 22 issue reported that Mallinckrodt Medical, Inc. will probably buy several hundred Versas this year. In fact, Mallinckrodt has not chosen a vendor.

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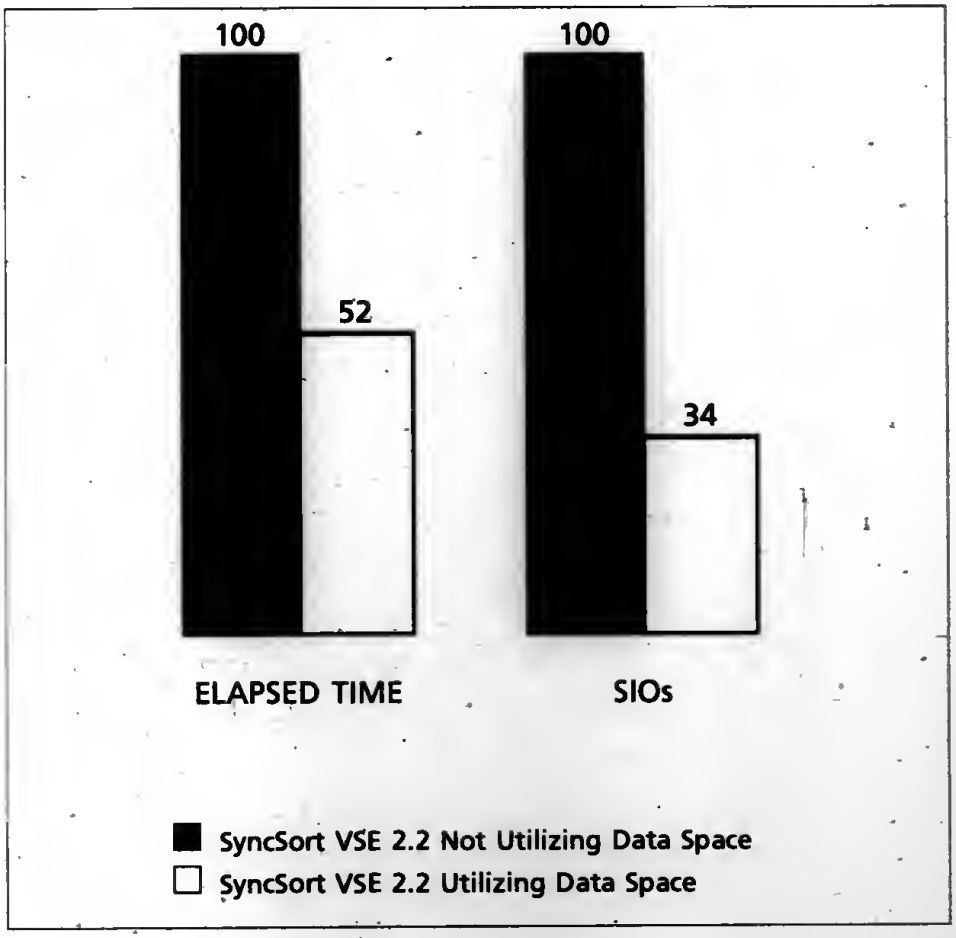

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First Data buys Anasazi

By Mark Halper
NEW YORK

In a fusion of low-profile forces intended to create a strong presence in the reservation outsourcing business, outsourcer First Data Corp. has acquired reservation technology specialist Anasazi, Inc.

The deal, consummated quietly earlier this year, was not disclosed because its value was immaterial to the stock of First Data, a First Data spokesman said.

First Data is a $1.2 billion company that went public a year ago. It was once part of American Express Co., which still owns a 22% stake, he noted.

The company is primarily a mainframe operator that sells credit-card processing services for 700 banks. It also processes data for hospital billing, mutual funds and cable television billing clients and is in the money order and money wire transfer business.

First Data's reservation activity has been limited to a processing job with Ryder System, Inc., and it acquired Anasazi to help catapult it into the travel sector, the spokesman said. It has a phone-answering business — often an element in reservation deals — by virtue of a telemarketing operation, he said.

Anasazi in Phoenix provides Unix-based reservation software licenses and also sells processing services using Unix technology. The 6-year-old company had revenue last year of about $20 million, said Chief Executive Officer Tom Castleberry.

Anasazi's licensing customers include Choice Hotels International, whose properties include Clarion Hotels & Resorts, Comfort Inns, Econo Lodge, Rodeway Inns and Quality Inns; Hospitality Franchise Systems, Inc., which owns Days Inn of America, Inc., Howard Johnson Hotels and Ramada Franchise Systems and is acquiring Super 8; and Promus Cos., which own Embassy Suites and Hampton Inns.

Its processing customers include Regent International Hotels, Four Seasons Hotels Ltd. and Sonesta International Hotels Corp. Prospective customers include Hilton Hotels Corp.

It is not yet clear how First Data will match its mainframe technology with Anasazi's largely open systems approach.

First Data details

First Data has data centers in Boston; Charlotte, N.C.; Denver; and Basildon in the UK. It earned $144 million on sales of $1.2 billion for the year ended Dec. 31.

Syncordia wins mega outsourcing pact

By Elisabeth Horwitt
LONDON

British Petroleum Co. (BP) has decided to outsource its data, voice and video communications needs and employees to Atlanta-based BT subsidiary Syncordia.

"It's part of a larger move toward outsourcing that BP has been doing for years now," a BP spokesman said. For example, BP Exploration outsourced all of its accounting services two years ago, which was a "huge success," he added. "Outsourcing provides substantial cost savings and allows your key personnel to concentrate on the core activities of the company."

Under a five-year contract, whose initial amount is $12 million per year, Syncordia will design, provision, manage and maintain network operations for BP's corporate headquarters here, as well as for the BP Exploration business, the company announced last week.

Other BP subsidiaries could buy into the contract during the next few months, a BP spokesman said.

The contract is part of an overall strategy on BP's part to outsource its entire data center, local-area network, desktop and network operations, the BP spokesman said. While the deals have not been officially announced, BP plans to outsource its data center services to Birmingham, England-based The Sema Group and outsource its desktop and LAN operations to Systems Applications International Corp. in San Diego, according to an industry source.

BP initially put out a request for information in December 1991 for a network outsourcing provider. Syncordia won the contract from a short list of six vendors.

BP's three outsourcers will integrate their management systems and support structures to provide the "proverbial one-number call" to resolve all problems, the Syncordia spokesman said.

Syncordia will provide network services through subcontracts with companies such as AT&T, Mercury International and BT, the spokesman said. Syncordia will also provision and manage all voice, videoconferencing and data networking equipment down to routers on the premise, he added. One of the other two vendors will manage BP's LAN equipment.

Up to 30 BP telecommunications employees will work at Syncordia. Ten have moved already.

Contracts with all three outsourcers include financial penalties for failure to provide a certain level of service, as well as credits for better service and greater cost savings, the Syncordia spokesman said.

Signed, sealed

BP Chemicals signed a three-year contract last August, under which Syncordia and BT's Global Network Service will interconnect 22 of the BP business' European sites.

Transaction processing

IBM downsizes CICS for OS/2-based client/server nets

By Joanie M. Wexler
WHITE PLAINS, N.Y.

Client/server computing won a minor victory last week when IBM said it would make its widespread, mainframe-oriented CICS transaction processing software available for OS/2 2.x servers and Apple Computer, Inc. Macintosh clients in September.

The IBM announcements, made in sync with the vendor's delivery of CICS-complementary "middleware" code, mean that companies can run CICS applications in local-area network environments either cooperatively with mainframes or sans big iron. To date, CICS has functioned primarily as a mainframe-based subsystem that implements transaction-based routing between terminals and applications.

A version of CICS for OS/2 is available today; however, it is a single-user system in which an OS/2 desktop is both client and server, and applications are not shared among end users.

With more than 20,000 copies of mainframe and OS/2 CICS packages already installed, "a key facilitating factor in downsizing is preserving the embedded software maintenance and expertise you have with CICS," observed Peter Burris, director of commercial systems research at International Data Corp., a research firm in Framingham, Mass.

Mac the client

Macintoshes will be used as clients in just 5% of all on-line transaction processing applications in 1993, according to the Standish Group International, Inc., which last week tabulated the results of a cross-industry, 3,600-company survey of client/server implementation plans.

To that end, Sears, Roebuck and Co. is beta-testing the new version of CICS OS/2 for servers in 800 retail stores for reading and checking pricing data and credit-card authorizations, according to IBM.

No immediate plans

Other CICS shops comforted by IBM's direction are not necessarily ready to install the software tomorrow.

For example, Robert Catalanotti, manager of information systems at manufacturing firm BW/IP International, Inc. in Vernon, Calif., said that while he has "no desire to put CICS on LANs now, it is important that IBM is making CICS available in a client/server environment so that we have alternative platforms" to choose from.

"However, the Unix platform [IBM's AIX] would be more attractive because it is more open; OS/2 is quite proprietary," Catalanotti said.

IBM intends to deliver CICS for AIX in June and a version for Hewlett-Packard Co. Unix platforms at the end of the year, according to Olwyn Spencer, IBM's CICS workstation products manager.

CICS for OS/2 client/server software costs $3,995 for the server. The client version — regardless of platform — costs $150.

IBM leads OLTP

1992 U.S. on-line transaction processing (OLTP) revenues (in millions)

Platform	
IBM CICS	$620
Other IBM	$90
Tandem	$75
Unix	$13
Other	$115
Total	$913

Source: Standish Group International, Inc.

Thirty-five companies had signed up to develop applications running under client/server CICS for OS/2 as of late last month.

IBM also filled in another box of its IBM Networking Blueprint last week with the Messaging and Queueing Series middleware it co-developed with Systems Strategies, Inc. for isolating programmers from the complexity of underlying networking protocols.

Messaging and Queueing handles the asynchronous (store and forward) portions of a given application, while CICS handles the synchronous (real-time) transaction processing activities.

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News Shorts

SQL Server kits ship

Microsoft Corp. last week shipped a second wave of beta-test kits for its 32-bit SQL Server for Windows NT software, boosting the number of beta-test sites from 600 to 1,500 — more than half of them at corporate sites. At the same time, the company is shipping a $495 client/server development kit to independent software developers and corporate developers.

Travel agencies to go wireless

In a significant endorsement of wireless local-area networks, **American Airlines'** Sabre reservation unit announced last week that it will allow its subscribers to install wireless LANs beginning in the middle of this month.

PC wave from IBM

IBM PC Co. plans to unveil tomorrow some 40 new models of its Personal System/ValuePoint machines, which will feature a minitower and top out at 33- and 66-MHz DX2 power. IBM will expand storage capacity up to 527M bytes and add second-level cache and two local buses. Last week, it announced two versions of its ThinkPad 710T, a second-generation pen-based machine. Meanwhile, company President Robert Corrigan told *The New York Times* that the business unit will post significantly better financial results in 1993 than it did in 1992.

New Apple attack on multimedia

Apple Computer, Inc. put new blood into its multimedia efforts last week with a series of announcements, including a five-part agreement with **MacroMedia** to provide Macintosh-based multimedia authoring tools and training centers. Apple also unveiled its newly created New Media/New Markets group, which will be charged with expanding Macintosh multimedia opportunities. **Kaleida**, the company resulting from an alliance between Apple and IBM, also announced that it is developing standards and licensing technology for cross-platform multimedia products.

Sterling makes golden deal

Sterling Software, Inc. last week agreed to acquire **Systems Center, Inc.** in a stock swap worth $185 million. Dallas-based Sterling provides systems software for data storage management, application development, information management and reporting and data communications. Systems Center, based in Reston, Va., sells tools for automating and controlling systems and networks, data transfer across heterogeneous environments and software distribution. The company's line of products for IBM's VM systems is especially strong.

SHORT TAKES Atlanta-based **Softlab, Inc.** said it has joined IBM's AD/Cycle alliance. . . . **Lotus Development Corp.** said it has delivered 125,000 copies of the Improv spreadsheet for Windows since it began shipments in early March. . . . **Spinnaker Software Corp.** completed its acquisition of utilities maker Power Up Software. . . . **Object Design, Inc.** in Burlington, Mass., and **Cadence Design Systems, Inc.** in San Jose, Calif., reached an agreement under which Cadence will build future versions of its software-aided design tools on top of Object Design's own ObjectStore database. . . . The Precision RISC Organization, which promotes **Hewlett-Packard Co.'s** Precision Architecture-RISC technology, is circulating specifications for an application programming interface designed to assure compatibility among different vendors' PA-RISC-based products.

News shorts, *page 16*

Gates feeds CAMPers tasty tidbits

By Michael Fitzgerald
ROSEMONT, ILL.

Microsoft Corp. Chairman Bill Gates fed interesting morsels, including better support for the Macintosh and Unix, to the audience at last week's meeting of the Corporate Association of Microcomputer Professionals (CAMP).

Gates told some 2,000 CAMP members that a beta-test version of his Windows NT operating system will ship this month to some 50,000 users and eventually will reach 70,000 beta-test users.

Citing a midyear Windows NT ship date, Gates hedged his bets by saying the shipment date could slip, "depending on the beta user feedback process."

Moreover, he said Microsoft is promising developers only that one million copies of NT will ship in the product's first 12 months on the market. That is less than the current run rate for IBM's OS/2.

Gates said that further down the road, DOS and Windows will merge with DOS 7.0 into a 32-bit, multithreaded operating system with graphical and character-based versions. He said this product is more than a year away.

Microsoft's Bill Gates *warned users NT could ship late*

Addressing multivendor systems, Gates said Microsoft plans to build a single application programming interface that will work between Windows, the Apple Computer, Inc. Macintosh and Unix.

"We are productizing our internal tools" for porting products between Windows and the Macintosh, Gates said. "We will provide a runtime layer for popular versions of Unix, though we will stay with the Windows interface."

Sun Microsystems, Inc., meanwhile, is working on "Wabi," or the Windows Application Binary Interface, which will run Windows applications native on Sun's Unix.

Gates avoided a question about when Microsoft will overtake Novell, Inc. in the networking market, but he predicted that Windows for Workgroups will outstrip Novell in small office environments, where the market leader is Artisoft, Inc.'s LANtastic.

Gates also conceded little to OS/2, predicting that it will fail to build "critical mass" with software developers. He said Microsoft will not develop OS/2 applications as long as OS/2 supports Windows applications, although it will develop certain products, such as electronic mail, for OS/2.

Support options

CONTINUED FROM PAGE 1

longer being enhanced.

• Free-support stalwart WordPerfect Corp. acknowledged that it is looking at for-fee programs and outsourcing support during peak periods.

• Microsoft Corp. recently started electronic, CD-ROM and network consulting programs priced at up to $15,000 per year.

• Third-party support providers such as Software Support, Inc. and Corporate Software, inc. now offer extensive end-user support programs, including dedicated on-site help.

• Retail outlets such as Computerland Corp., Merisel, Inc. and Egghead Software now sell support offered by their own technicians or third parties.

Users said they will not pay for support plans unless they receive tailored, high-quality service in return. "If I have an advanced question, I should not have to deal with front-line people who read the manuals back to me," said Greg Feeler, information systems manager at Employer's Resource, Inc. in Boise, Idaho.

Paid support should lead to better service, said Jeff Tarter, publisher of "SoftLetter" in Watertown, Mass. He said many corporate users doing tricky implementations "are perfectly willing to pay for support."

But to make sure they get what they are willing to pay for, users will have to adjust to studying support needs more carefully than they had been, observers said. Balancing the cost/value equation is key, agreed Andrew Boswell, associate consultant at Baxter Healthcare Corp.'s I.V. Systems Division in Round Lake, Ill.

"If you need an hour of staff time to answer a question vs. a two- or three-minute phone call, would it really cost you to pay for services?" Boswell mused.

Most of the major PC software makers offer so-called "premium" for-fee support programs to large customers. But now users of all sizes can bypass vendors and opt for paid programs from third-party providers or retailers that, in some cases, offer services that vendors do not (see chart).

Free no more

Free PC software support services are minimal compared with what corporate users need, especially as downsizing fever burns and support questions become more complicated

FREE

- First 90 days.
- Fax-back programs.

PAID

- 24-hour hot lines — both 800 and 900 numbers.
- Remote help desks.
- Tailored attention from support staff who know users' particular hardware and software setups.
- Detailed reports of frequent trouble spots.
- Electronic distribution of software.
- CD-ROM manuals and answers to commonly asked questions.

CW Chart: Janell Genovese

For example, users can get on-site technical staff from third-party providers. Those technicians become intimate with a firm's hardware and software configurations and can better troubleshoot problems, industry watchers said.

Further, because firms such as Software Support and Corporate Software act as backup resources to vendors during peak periods, customers are more likely to reach technical people on help lines.

That in itself is an improvement, said John Morgan, manager of pharmaceutical systems at Pfizer, Inc.'s U.S. Pharmaceuticals Group in New York. "Any way we can avoid [waiting on the phone] is welcome," Morgan said.

His unit outsourced PC software support to Corporate Software a year ago to support some 1,200 DOS, Microsoft Windows and IBM OS/2 PC users. Corporate Software offered attractive deals, Morgan said.

Dealing with one vendor for total support needs attracted Chemical Bank Corp. in New York to Corporate Software, said Anni Levy, manager of vendor relations and contract negotiations. More than 1,300 PC users in the bank's Geoserv unit call a toll-free number at Corporate Software for help, and Levy is thinking of expanding that contract.

"If there's a company able to bundle help desk support without jacking up the price of the packages too much, all the better," Levy said. Geoserv also buys standard spreadsheet and word processing packages from Corporate Software.

Senior writer Michael Fitzgerald contributed to this report.

Until now, distributing software involved a plan of action that was long on action and short on plan.

Other than the fact that somebody racks up a lot of freqoent flyer miles, there's not much good you can say about how some companies typically distribute software to end users. But now, there's a way to automate the process — AM:PM™, the centrally controlled Electronic Software Distribution and Asset Management solution.

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W-CWX-930405

TCP/IP barriers falling

CONTINUED FROM PAGE 1

This is of particular importance to user consortia such as the User Alliance for Open Systems and the Electronic Power Research Institute, which have turned to OSI as the "official" international standard but do not expect their existing TCP/IP installations to go away, according to Augie Nevolo, chief telecommunications engineer at Pacific Gas & Electric Co.

The U.S. government also expects to deal with both protocol stacks in the future, according to Richard Colella, a spokesman for the National Institute of Standards and Technology. A number of government users "comply with the spirit" of the Government OSI Profile by providing OSI-based gateways between systems that are running TCP/IP, he added.

Another user, at a major aerospace firm, expressed hope that a closer association with ISO would make the IETF more responsive to the needs of corporate users. For example, TCP/IP applications such as Telnet lack the application programming interfaces (API) that would make corporate IS managers' lives so much easier, he added.

Vendors, not the IETF, are addressing the API problem, Chapin said.

The IETF just recently began addressing security on the Internet and in TCP/IP, Colella said. This has grown increasingly crucial to commercial and government users on the Internet, who are finding it harder to control access from the comparatively insecure Internet because their computing installations are becoming more distributed, he added.

Network reliability is another top priority for commercial users that the IETF has been slow to address, Chapin said. "In the engineering world, a network failure is exciting; in the commercial world, it's the worst thing that can happen."

We can work it out

The IETF formed its first working groups last week to deal with the problems of integrating TCP/IP and IBM SNA networks. One set of groups will come up with specifications for managing SNA devices via Simple Network Management Protocol systems.

A less formal "birds of a feather" session chaired by Cisco Systems, Inc. discussed strategies for enabling TCP/IP backbones to handle SNA more effectively.

Taking care of business

IETF workgroups last week addressed several issues near to commercial users' hearts, including the following:

- More standardized, trouble-free, reliable transport of IBM Systems Network Architecture (SNA) traffic and devices that are linked to TCP/IP backbones.
- Implementation of key OSI applications on top of TCP/IP. Prominent among these are the X.400 electronic-mail and X.500 directory standards, which provide a number of features that corporate users would like to see in TCP/IP applications.

Unlike TCP/IP's Simple Mail Transfer Protocol (SMTP), for example, X.400 supports compound messages that can include pictures, compressed video and encrypted digital signatures, Chapin said.

- Guaranteed delivery time over a TCP/IP network — a capability that would pave the way to supporting multimedia applications, videoconferencing and more effective SNA communications over TCP/IP.

One of the thornier issues at last week's meeting was how to enhance TCP/IP addressing and routing protocols to handle increasingly gargantuan networks.

If the problem is not addressed within the next two or three years, major network communities such as Internet will run out of new addresses to allocate, and routers may start dragging or even breaking down, according to IETF spokesmen.

Four proposals were on the table at the meeting, one of them based on the OSI ConnectionLess Network Protocol. Consensus seemed a long way off.

EDI, X.400 integration push

CONTINUED FROM PAGE 1

Instructions included

One of the main benefits of using X.400 messaging technology for EDI includes the ability to send multiple types of data to trading partners. For instance, rather than just sending an electronic form for ordering parts, a company could include an E-mail message with instructions and an attached graphics file with an illustration.

Who uses EDI?

Of the 25,000 companies using EDI in the U.S. as of October 1992, breakdown by industry was as follows:

NUMBERS HAVE BEEN ROUNDED

Chemical	48%
Aircraft and suppliers	4%
Automotive and trucking	3%
Petroleum	.01%
Other	45%

Source: EDI, spread the word

Shell Oil Co. and Meridian Oil. PIDX met with software vendors and network service providers in Houston last week to advocate hardware, software and network services that support X.400 and X.435.

"Oil companies see it as the way to go to reduce costs and provide a better level of service," said Bryan Swinney, EDI specialist at Texaco and a PIDX member.

In addition, some of the largest companies from the aerospace, chemical and automotive industries see X.400 and X.435 as vital to the growth of EDI. And government agencies, including the Department of Defense and the Internal Revenue Service, plan to use X.400 with X.435-based EDI.

Users have already had some success with vendors. For example, in 1991 the aerospace industry prompted value-added network (VAN) carriers to agree to link their X.400 messaging services, said Ray Day, manager of EDI systems at Vought Aircraft Co. in Dallas who is on the Aerospace Industry Association's EDI panel. The push for X.435 EDI service is the next step, he said.

Only the beginning

However, this is only a first step. "Our goal is to move [EDI] to X.400 as soon as possible. If the right products were there for the right price, we would switch tomorrow," said Bob Majowicz, EDI project leader at Air Products and Chemicals, Inc., a chemical and gas manufacturer in Allentown, Pa.

Some vendors are dragging their feet because they doubt that large companies that have already invested in smaller trading partners will be quick to change to new X.435 networks, predicted Chris Finn, an analyst at TeleChoice, Inc. in Verona, N.J.

So some user companies are forging ahead with X.400-based EDI on their own.

Byer California, a clothing manufacturer in San Francisco, is using X.435 software from Isocor and EDI translation software from St. Paul Software. With those tools, it automatically downloads EDI data from trading partners into an order-entry system, eliminating human intervention.

"It's going slowly, by choice," said Michael Higgins, technical support manager at Byer. "We didn't want to risk what we have" to switch to the new technology.

The good news is that this fall, users can expect support for X.435 to show up in many VAN services and EDI software products, said Vic Wheatman, a program director at Gartner Group, Inc.'s Santa Clara, Calif., office (see story below).

The moves should come none too soon, as users are already describing traditional EDI technology as outdated.

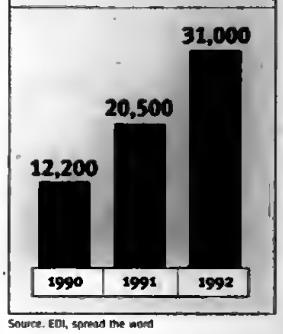
"If you have two users on different VANs, there are no guarantees that your EDI document will get from one [network] to another," said Paul Markovitz, a computer scientist at the National Institute of Standards and Technology in Gaithersburg, Md., which is prototyping X.435 for several federal agencies.

"The inter-VAN communication is dial, dump and pray. If it makes it, fine. If it doesn't, who's to blame?" he asked.

There are non-X.435 techniques for solving inter-VAN problems, said Martha Hanlan, director of application services at VAN service provider BT North America, Inc. in San Jose, Calif. However, the arrival of X.435 should help inter-VAN communications prevent vendor fingerpointing, she said.

More firms cut paper costs

The number of companies going paperless grew by half from '91 to '92



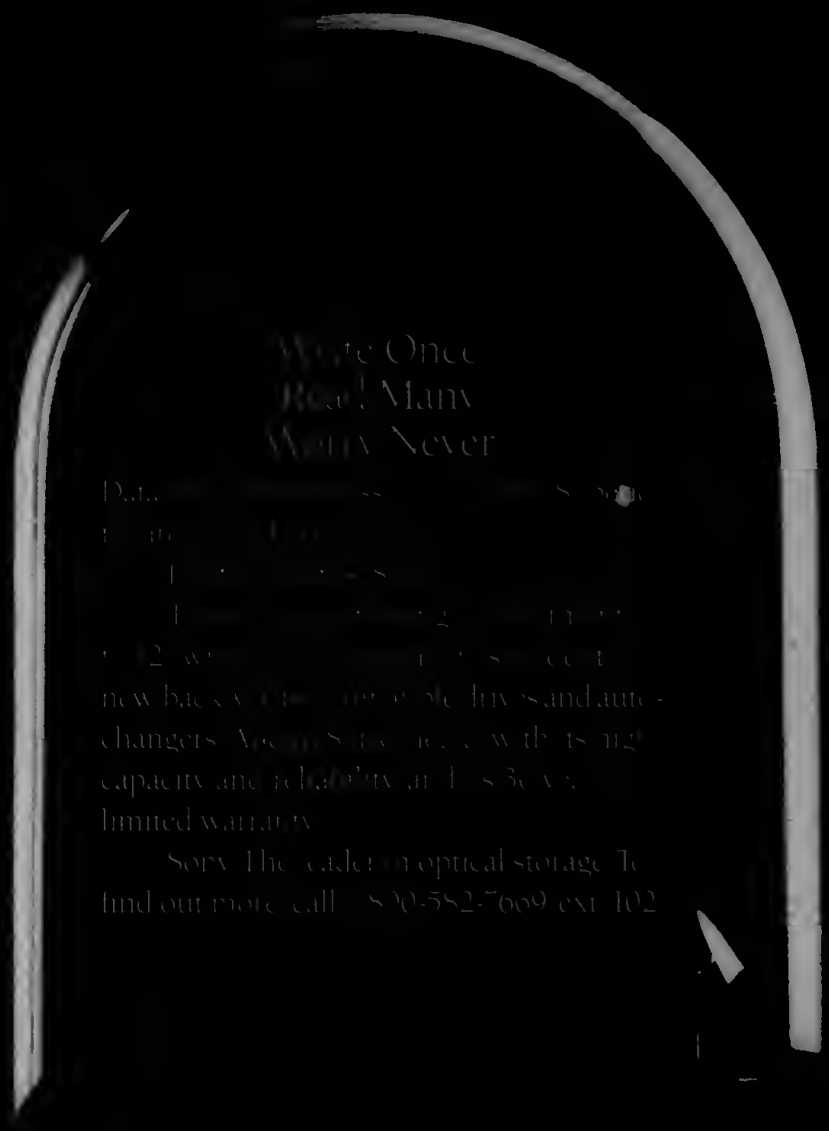
Source: EDI, spread the word

X.435 vendor support plans galore

Support for X.435 is beginning to coalesce, and several vendors plan to roll out new products by year's end, including the following:

- **BT North America, Inc.** will announce on April 14 an EDI-to-X.400 gateway service with "X.435-like" features that let users track and secure messages.
- **Digital Equipment Corp.** intends to ship X.435 capabilities in the next version of its DEC EDI gateway software. Although DEC would not confirm ship dates, analysts said they expect a May or June release.
- **General Electric Information Services** will add elements of X.435 to its EDIExpress service and mainframe and midrange translation software in the fourth quarter.
- **On April 14, Sterling Software, Inc.** will announce X.400 connectivity for its EDI service, but it will not pursue X.435 until there is more market demand, a spokesperson said.
- **Texas Instruments, Inc.** is testing X.435 EDI translation software for internal use and plans to prerelease commercial versions in June or July.

SONY



FileNet to add to work-flow lineup

By Ellis Booker
CHICAGO

FileNet Corp. will take the wraps off its next-generation work-flow product this week with the introduction of Visual WorkFlo, a system that combines object-oriented and visual programming technologies to model, re-engineer and automate business processes.

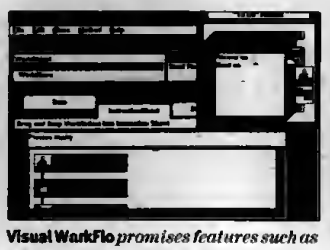
Visual WorkFlo is slated to debut this week at the annual Association for Information and Image Management show in Chicago, but the first pieces will not be commercially available until the first quarter of 1994. Pricing will be announced in July prior to a controlled release in the fourth quarter.

In its initial release, the system will be targeted at developers building work-flow applications with or without imaging services.

"Work flow" has become the battleground for vendors of imaging systems, as well as for the fast-evolving market for process re-engineering software tools. FileNet's existing WorkFlo scripting language will continue to be enhanced and can be incorporated into Visual WorkFlo, according to FileNet.

End users and analysts said promised features in Visual WorkFlo — notably an ability to use objects created by other application development systems — reflect broad technical and customer requirements.

"It's something the industry needs — a platform for developing applications in which image is just a part, just another data type," said John Squires, group supervisor of image processing at St. Paul Fire and Marine Insurance Co. in Minnesota, which has 16 users on a FileNet imaging application. Squires was able to see the new FileNet software in prototype form earlier this year at the vendor's Costa Mesa, Calif., headquarters.



Visual WorkFlo *promises features such as the ability to use objects created by other application development systems*

"It's great they are moving to objects," said Jan Scites, senior vice president of individual life insurance at Connecticut Mutual Life Insurance Co. in Hartford. Although it is FileNet's largest installation with more than 400 image-enabled workstations, Connecticut Mutual will not use the new work-flow product because it developed an object-oriented tool that is already being used in a dramatic re-engineering project.

The software consists of "InstructionSheet" objects built up from libraries of reusable programs called "WorkPerFormers," which can image and display services from FileNet or other desktop or server applications written in other environments.

Nevertheless, Scites said, FileNet has the competence to take on the broader market for business process re-engineering tools. Some analysts agreed.

"They have the largest installed base of work-flow customers there is," said Mike Howard, vice president of office information systems at Gartner Group, Inc. in Stamford, Conn. If FileNet can convert its existing work-flow scripts into Visual WorkFlo objects, "they'll create a valuable library," he said.

Scott McCready, director of image systems at IDC/Avante Technology in Framingham, Mass., compared FileNet's approach to the plethora of graphical user interface-based work-flow systems now coming to market.

At least "80% to 90% of what good business process automation is about is what happens when the work arrives at the desktop. Getting it to the desktop is easy," McCready said.

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Solaris strategy seeks to steal thunder from NT

By Maryfran Johnson
SANTA BARBARA, CALIF.

■ SunSoft, Inc. sharpened its claws for the climb onto corporate desktops last week, rolling out a new version of its Solaris Unix operating system for Intel Corp. PCs and declaring IBM's PowerPC chip as the next target platform for Solaris.

SunSoft used the Solaris Developers Conference, which attracted 1,700 attendees, to hammer home the message that its 32-bit operating system is far more ready for commercial prime time than Microsoft Corp.'s upcoming Windows NT. Sun also demonstrated new technology that allows Windows applications to run under Solaris.

The emphasis on using Solaris to run large commercial enterprises was highlighted by conference speaker Dennis Jones, chief information officer at Federal Express Corp.

"Client/server computing with Sun platforms and products is a key part of our overall plan for information technology," Jones said. He noted how Fedex's internal command and control system for transportation management will eventually include 1,000 SPARCstation 10 workstations and servers.

Ease of use was another issue developers and users identified as an increasingly important element for Sun to address.

"If Solaris is to succeed, Sun needs a set of video training courses that make it as easy to use Unix as Bob Vila made repairing your house in *This Old House*," said David Pensak, corporate adviser of computing technology at Du Pont Co. in Wilmington, Del.

As an early user of Solaris on Intel, Pensak said he was pleasantly surprised at the solid technical job SunSoft did with the X86 port. "The only real fly in the ointment," he added, "is that most of the Unix goodies designed for 1,280 by 1,020 [high resolution, 17-in.] monitors don't look so good on the smaller, 14-in. monitors on PCs. The windows get all squished together and just don't read as well."

Although Sun officials said there will be 1 million installations of Solaris by the end of this year, the thought seemed to lend them little comfort. The phantom presence of Microsoft Corp. Chairman Bill Gates was pervasive at the conference, where "Bill bashing" led to some bizarre demonstrations of technology. In one display of multiprocessor use of SPARCstations, a simulated wind tunnel was used to blow a model of Gates' head into smithereens.

"I thought the display of hostility against Bill Gates was a little much," said Jeff Canin, an analyst at Salomon Brothers, Inc. in San Francisco. "It suggests that there's a lot more fear there than Sun [will] acknowledge."

Gates' predictions

For his part, Gates seems to have no problem accepting Unix as a permanent part of the computing landscape. In remarks made last week at a meeting of the Corporate Association of Microcomputer Professionals, Gates said future desktops will be dominated by Windows and Windows NT, Apple Computer, Inc.'s Macintosh and Unix. He also revealed plans to provide a single Win32 application programming interface for Macintoshes and Unix.

A few hardware tidbits also surfaced at the developers conference, including Sun's expected entry this summer into the X Window System terminal market and the spring announcement of the eight-way "Scorpion" multiprocessor SPARCserver.

The X terminal will be based on the Sun ELC low-end system, with the unusual twist of allowing upgradability to a full workstation, according to users familiar with the still-secret Sun X terminals.

While the marketing thunder was deafening at the developers conference, some attendees found the rain of details to be a bit too light. A number said they had hoped to hear more solid details about Sun's participation in the Common Open Software Environment (COSE), but no details were forthcoming.

Of concern to developers is the fate of Sun's OpenLook graphical user interface (GUI), which lost the battle to the Open Software Foundation's Motif GUI in the COSE effort.

Senior writer Michael Fitzgerald contributed to this report.

Solaris directions

Announcement highlights from the Solaris Developers Conference include:

- **Solaris for X86 Intel-based systems is slated for May delivery, with commitments lined up from major PC system vendors such as AST Research and Dell. Dell will initially offer Solaris X86 on its 1486-based systems and then on machines running Intel's Pentium microprocessor.**
- **With assistance from Motorola, SunSoft plans to have its 32-bit Solaris Unix operating system ported to the PowerPC RISC chip by early 1994. PowerPC is being developed by IBM, Motorola and Apple.**
- **SunSoft will ship Solaris 2.2 in May with a number of enhancements aimed at commercial enterprisewide computing. Those include a 60% performance increase in multiprocessing, more robust graphics products, multithreading to speed up application performance and a 10% to 15% improvement in the speed of network data transfer.**
- **Sun demonstrated a new but still unannounced product called "Wabi," for Windows Application Binary Interface, which will run Microsoft Windows applications native on Solaris Unix at performance equal to 486-based PCs. Sun will ship Wabi bundled with Solaris 2.2 next month on Intel and SPARC platforms.**

Source: SunSoft, Inc.

CW Chart: Janell Genovese

X86 pricing

SunSoft's Solaris X86 will ship next month in three price categories: **Solaris Desktop** at $795 for a single client license; **Solaris Workgroup Server** at $1,995; and **Solaris Enterprise Server** at $5,995. Among the basic system features are **SunOS 5**, ONC+ networking, multiprocessing, **DeskSet** tools and **OpenWindows**. The software developer's kit costs $495.

DEC deal drives 3-D graphics push

By Melinda-Carol Ballou

With the aid of Kubota Pacific Computer, Inc., Digital Equipment Corp. last week broke into the high end of the three-dimensional graphics market, which so far has been dominated by Silicon Graphics, Inc. and Hewlett-Packard Co.

DEC and Kubota are now shipping imaging and graphics workstations that bring together Kubota's high-speed graphics subsystems and the CPU power of DEC's OSF/1 Alpha AXP workstations. This, along with DEC's shipment of new Alpha OSF/1 workstations this month, may bring DEC full force into the raging price/performance wars in the technical workstation market.

The Kubota Denali workstations announced last week are based around DEC's already announced DEC 3000 Models 400 and 500 for OSF/1. They feature a desktop architecture that combines hardware support for both high-performance imaging and graphics rendering, Kubota officials said.

The Denali graphics subsystem connects to the Kenai workstation's 100M byte/sec. open I/O bus and can be configured with up to six transform engine modules. These perform all floating-point operations, imaging and geometry processing in the graphics subsystem, leaving the Alpha processor on the workstation available for data manipulation.

Kubota's graphics subsystems will also run in conjunction with new OSF/1-based DEC platforms to be announced later this month. Those workstations will put DEC in the top price/performance tier along with IBM, HP and Sun Microsystems, Inc., according to industry analysts. However, an initial lack of applications may hinder DEC's progress, they added.

Later this year, DEC will ship a new family of midrange graphics products based on its PXG graphics and Alpha AXP workstations.

Those products will let DEC/Kubota fill out offerings on the high end with the DEC 3000 Model 500Z, which runs at 200 MHz, has SPECmark ratings of 105 SPECint92 and 160 SPECfp92 and costs approximately $60,000; and on the lower end with the DEC 3000 Model 300, which is priced at roughly $7,990, according to sources. A third platform, the DEC 3000 Model 300L, will be priced at $4,995, the companies said.

Teaming up with Alpha

Kubota targets the technical market with DEC's Alpha AXP-based graphics workstations. Here's how the competition and DEC/Kubota boxes line up:

Vendor	Platform	MHz	SPECmarks: Floating point	SPECmarks: Integer	Base price
DEC/Kubota	Kenai 3500 E1.5	150	127.7	84.4	$51,995
DEC/Kubota	Kenai 3400 E1.5	133	112.5	74.8	$34,445
Silicon Graphics	Indigo R4000 Elan	100	60.5	57.5	$32,500
HP	735 CRX-24Z	99	150.6	80.0	$48,045
IBM	RS/6000 370 GTO	62.5	118.2	59.8	$48,835
Sun	SPARCstation 10/41-GT	40	63.4	53.2	$45,717

MCAE, CAD/CAM configuration with 32M bytes of RAM, 1G-byte disk, 19-in. color monitor. DEC/Kubota price also includes CD-ROM, roughly comparable lowest end offerings for graphics performance.

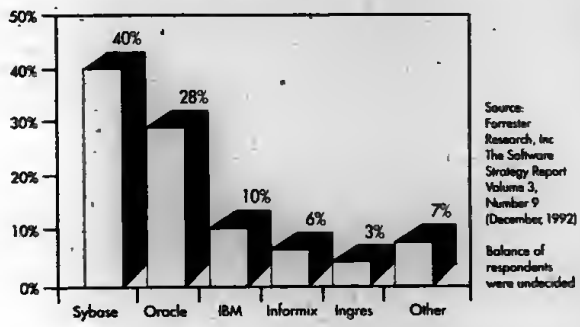
Source: D. H. Brown Associates, Inc.

New dimension for Alpha

"What this [Kubota announcement] does for DEC is let them sell Alpha workstations for the first time to customers who require 3-D graphics," said Ted Krum, an analyst at D. H. Brown Associates, Inc., a consulting firm in Port Chester, N.Y. "DEC now has a package that will enable it to start getting back into that game at a very good price/performance level."

HP's highest performance graphics offering, the CRX-48Z, transfers 600,000 flat-shaded, unlit 50-pixel triangle/sec., and Silicon Graphics' highest end VGXT offering supports 1.1 million flat-shaded, unlit 50-pixel triangle/sec., according to Krum. With its Denali V620, Kubota offers 1.2 million Gouraud-shaded, lit 50-pixel triangle/sec. that are buffered to offer depth, he said. The Kubota products also support 2-D and 3-D imaging and will be available from both companies.

The analysts have graphed the future of Client/Server computing.



Source: Forrester Research, Inc The Software Strategy Report Volume 3, Number 9 (December 1992)

Balance of respondents were undecided

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Prescription for a troubled IBM

By CW Staff

As the industry waits to see what decisions IBM's new chairman makes during the next six months, many users and analysts say they expect to see the struggling giant reduce the number of products it sells and supports.

"They have to assess every product in the sales manual to determine profitability and likely future profitability and get down to the core products that are going to take them into the next century," said James Cassell, an analyst at Gartner Group, Inc. "Why should IBM make modems?"

Specific product line decisions will likely come during the next six to 12 months, analysts said. Following are the key strategies and challenges ahead:

Mainframes, long an IBM staple, face a declining dollar market, although processing demands are growing

▶ Mainframe hardware

Estimated 1992 revenue: $12.7 billion, an 8% drop from 1991.

Challenge: To sustain a mainframe business that still accounts for about 50% of IBM's profits, while developing the next generation of parallel processing.

Strategy: IBM's large systems have taken a beating in the past few years as the overall market has shrunk nearly 25%. But these figures can be somewhat misleading. "Mainframe MIPS are growing 20% a year," Cassell said.

The problem is that IBM's prices are still higher than competitors'. Nick Donofrio, IBM's Enterprise Systems general manager, recently conceded that his top priority is to "get the costs out of our current set of platforms."

To do that, IBM will deliver in the next year a family of parallel-processing mainframes that will cut costs at least in half. These machines should eventually become more general-purpose and will not require customers to rewrite their computer applications.

Big Blue bucks

In addition to giving new chairman Louis V. Gerstner Jr. a $3.5 million base compensation, the IBM board voted to pay him a onetime fee of $5 million to reimburse him for options he gave up when he left RJR Nabisco, Inc.

Last year, Gerstner earned $3 million in salary and bonuses at RJR Nabisco.

Another part of Gerstner's compensation package is a guarantee allowing him to buy up to 500,000 IBM shares at a price that has not yet been set.

▶ Application System/400

Estimated 1992 revenue: $14 billion.

Challenge: To keep small to medium-size users satisfied while enhancing products for large corporate customers.

Strategy: With 200,000 units installed worldwide, the AS/400 is still primarily a small and medium-size business machine with some applications in far-flung global networks. Now IBM must turn the AS/400's key features, such as built-in database and systems management software, into assets. One obstacle is that the AS/400 is still proprietary, which limits developer flexibility.

Users also said IBM needs to make good on its promises of client/server support for the AS/400, which still relies too heavily on terminal emulation. For large corporations to take to the AS/400, IBM must serve as a business partner. "They should have very seamless integration, which would be an advantage over other vendors' Unix systems," said Michael Chang, director of decision-support systems at Nissan Motor Corp. in Gardena, Calif.

▶ Enterprise software

Estimated 1992 revenue: $2.7 billion.

Challenge: To make relational databases competitive with other vendors' products and move toward client/server.

Strategy: IBM's Programming Systems business unit is one of its best hopes for the open systems market, but only if IBM will support other vendors' platforms. IBM has taken its first steps in that direction by saying it plans to port its DB2/6000 Unix database to Hewlett-Packard Co. machines.

IBM's Distributed Relational Database Architecture will be supported by many database vendors, but this alone is not a competitive advantage.

IBM software facilities will also have to act quickly. Donald Feinberg, a Gartner Group program director, said IBM designers have already shown they can cut time to market in half compared with the traditional two-year cycle.

▶ Storage

Estimated 1992 revenue: $6.1 billion

Challenge: To continue technology leadership while cutting costs.

Strategy: Most of the IBM Adstar subsidiary's research and development will continue to pour into general-purpose 2-in. and 3-in. disk drives. Adstar will also focus on alternative storage, such as optical and tape, that work with computers from other suppliers.

But Adstar is coping with some hefty staff cutbacks — going from a high of 17,500 people to 13,600 by year's end. It will consolidate its 10 manufacturing facilities into three primary plants. Many analysts said they expect Adstar to become a fully independent business within about two years.

▶ Open systems

Estimated 1992 revenue: $2 billion.

Challenge: To deliver on the promise of open computing throughout IBM.

Strategy: "Open systems" has become a mantra at IBM. This year alone, IBM has played up the "open" angle in product introductions for its mainframe and AS/400 product lines. Within the next two years, the AS/400 unit will begin building its machines based on the PowerPC chip.

"It's clear that each division is responding to open systems pressure in its own way," said Omri Serlin, an analyst at ITOM International Co. in Los Altos, Calif.

▶ PC hardware and software

Estimated 1992 hardware revenue (including RISC System/6000): $9.8 billion.

Challenge: To regain market share and establish OS/2 as a viable operating system contender.

Strategy: The IBM PC Co. must garner higher sales volumes to survive price wars with clone suppliers. Recent turns toward direct sales and aggressive price-cutting have stopped market share erosion, and products such as the ThinkPad are improving IBM's image as a technology leader.

ThinkPad is needed to improve IBM's leadership image

At the same time, IBM faces a struggle with Microsoft Corp. to deploy the next generation of object-oriented operating systems.

In the near term, IBM will position OS/2 on Intel Corp. platforms against Unix and Microsoft's forthcoming DOS 7.0 offering, which is expected to add multitasking capabilities. IBM also plans to deliver a portable version of OS/2 for its PowerPC reduced instruction set computing systems that it will position against Microsoft's Windows NT/Unix.

But IBM's ultimate success may ride on the Taligent object-oriented operating system that it is building with Apple Computer, Inc. The challenge is that Taligent can be delivered before Microsoft brings its rival Cairo operating system project to fruition.

▶ Networking

Estimated 1992 revenue: $5.3 billion.

Challenge: To remain profitable while exploiting new markets and promoting wider adoption of its networking software on platforms other than its own.

USERS TO GERSTNER: LISTEN UP!

181 users of IBM mainframe and midrange systems gave the following advice to IBM's new CEO in an exclusive survey conducted by the *Computerworld* Database Division last week:

Users recommended the following priorities for Gerstner's strategy...

ITEMS RANKED IN ORDER OF IMPORTANCE

AVERAGE RATING	
4.4	Get closer to customers
4.2	Shake up senior management
4.1	Drop unprofitable product lines
3.8	Restructure the sales force
3.4	Scale back mainframe emphasis
3.3	Revive Microsoft partnership
2.9	Initiate major layoffs
2.4	Break up the company

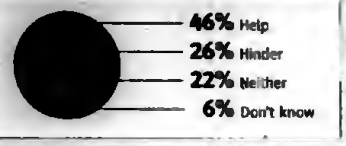
RATINGS BASED ON 1-TO-5 SCALE, WHERE 5 IS VERY IMPORTANT

...and they picked the following short-term goals:

1. Improve customer communication.
2. Make stronger commitment to nonmainframe technology.
3. Return to profitability.
4. Reassure customers that company is stable.

RANKED IN ORDER OF MOST FREQUENTLY NAMED

Most IBM users surveyed also said Gerstner's lack of information technology experience will help his performance



Source: *Computerworld* Database Division

IBM makes first break with no-layoff policy

By Nell Margolis

Moving to put teeth in its mid-December promise to streamline its efforts for renewed profitability, IBM last week laid off about 2,400 people in its mid-Hudson Valley, N.Y., region. The first significant, product line-related break with the company's historical no-layoff policy struck at the heart of its mainframe and peripherals manufacturing operations.

"This is the bare beginning," said David Wu, an analyst at S. G. Warburg & Co. Dismissing IBM's recent estimate that it will eliminate 25,000 jobs this year as "the Akers regime figure," Wu predicted that the job-cut tally will swell, and perhaps even double, in the first years of new Chairman and Chief Executive Officer Louis V. Gerstner Jr.'s reign.

IBM spokesman James Ruderman agreed that 1993 job cuts are almost certain to exceed the 25,000 target.

The higher it turns out to be, the better, said Robert Djurdjevic, president of Phoenix-based Annex Research. A veteran IBM analyst, Djurdjevic is one of a large cadre of industry observers who have long tarred IBM's slimming efforts as too little, too late.

"I expect to see more like 34,000 jobs eliminated worldwide by the end of 1993 — about 13,000 of them from the lines of business, particularly Enterprise Systems, Adstar, Personal Systems and Technology Products," he said.

However deep the layoffs cut within given product lines, Djurdjevic added, no specific product line is likely to be hard hit. There is still sufficient waste in the company's operations to allow for major cutting without endangering quantity or quality, he said.

IBM's year-end 1992 figures show the company's work force at approximately 301,500 worldwide, with the U.S. accounting for some 158,000 and Europe an estimated 90,000.

The latter count could drop sharply in the coming months, according to analysts. Several predicted a strong spate of job cuts across IBM Europe's 11 regions this year. By the end of last week, the company had already begun to prove them right. IBM Europe announced it has targeted 10,000 jobs for elimination — 2,600 of them within the current year.

Smaller Blue

•ONCE UNHEARD OF, WORK-FORCE REDUCTIONS ARE BECOMING MORE FREQUENT AT IBM

- IBM targets for elimination 6,000 jobs in New York's mid-Hudson Valley region.
- Employees receive layoff notices:
  - 1,400 in Poughkeepsie, N.Y., and Kingston, N.Y.
  - 1,000+ in East Fishkill, N.Y.
- IBM Europe announces that 2,600 jobs will be cut by the end of 1993.

Source: IBM

Troubled IBM

CONTINUED FROM PAGE 14

Strategy: IBM's Networking Systems business unit faces a large market opportunity in emerging high-speed network markets, such as Asynchronous Transfer Mode, where there is no installed base to penetrate. IBM must also profitably migrate or blend users of hierarchical Systems Network Architecture-based terminal-to-host networks with downsized, local-area network based computing.

Expect the company to push ahead with alliances and licensing programs for getting IBM communications software, such as SystemView and NetView, CICS transaction processing and Advanced Peer-to-Peer Networking (APPN) communications protocols, onto widely installed non-IBM platforms.

IBM must also commit to making its key networking software, particularly APPN Network Node, as nonproprietary as possible by licensing code or providing written specs at little or no cost.

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News Shorts

SEC to look at Wang stock decision

While **Wang Laboratories, Inc.**'s stock was originally going to be delisted as of March 31, the American Stock Exchange reversed its decision last week and Rep. Edward Markey (D-Mass.), chairman of the House Telecommunications and Finance Subcommittee, asked the Securities and Exchange Commission to investigate the exchange's decision. Markey is concerned that unwary investors will be exploited in the exchange of Wang shares, which will be traded for "warrants" under Wang's reorganization plan and have lost nearly all their value.

Hertz and ISSC sign

The Hertz Co. last week signed a five-year, $80 million outsourcing contract with IBM's **Integrated Systems Solutions Corp.** (ISSC) subsidiary. The two companies had reached a tentative accord five months ago [CW, Nov. 9, 1992]. The deal calls for ISSC to take over IBM-based operations and "business recovery services" and a large amount of application development, an ISSC spokesman said.

Huge router net down under

Telecom Australia said it intends to slash internal communications costs by up to $50 million per year with a network backbone based largely on high-end routers from **Network Systems Corp.** The network will consolidate 26 previously separate wide-area networks into one Transmission Control Protocol/Internet Protocol and **Novell, Inc.** IPX-based backbone serving 25,000 PCs, 15,000 terminals, 500 Unix workstations and more than 1,200 Novell servers.

Cray-3 ready

Cray Computer Corp. last week introduced the Cray-3, its long-awaited, general-purpose supercomputer series. Seymour Cray formed Cray Computer in May 1989 after splitting off from **Cray Research, Inc.** Starting with a single-processor, $2.95 million system with 64 Megawords of memory, the Cray-3 scales up to a 16-processor system with 1 Gigaword of memory. It is priced at a little more than $30 million.

DEC expands TP services

As expected, **Digital Equipment Corp.** added support for new clients and services for the company's Application Control and Management System last week [CW, March 8]. Additional servers for the transaction processing system will include the **Open Software Foundation**'s OSF/1 in 1993 and **Microsoft Corp.**'s Windows NT platforms thereafter. Support for clients on Windows NT will be available on Alpha AXP platforms later this year and on Intel Corp. clients shortly thereafter.

SHORT TAKES President Bill Clinton last week nominated **Western Digital Corp.** Chairman and Chief Executive Officer Roger W. Johnson to head the **U.S. General Services Administration** (GSA).... **Colorado Memory Systems, Inc.** in Loveland, Colo., said President and CEO Edwin L. Harper is leaving the company April 16.... Storage vendor **IPL Systems, Inc.** named former **Memorex-Telex** executive Greg R. Grodhaus as president and CEO.... Computer retailer **CompUSA, Inc.** announced third-quarter sales of $365 million, up 68.2% over the comparable period in 1992.... PC network products vendor **Standard Microsystems Corp.** reported first-quarter profits of $15.8 million, compared with only $595,000 for first-quarter 1992, and revenue growth of 89% to $250.5 million.... **DEC** announced it is moving its offices at the Maynard Mill complex to DEC-owned facilities in Maynard, Mass., starting later this summer.

AMR back in hot seat

Partner Budget Rent A Car files suit in alleged Confirm cover-up

By Mark Halper
DALLAS

■ AMR Corp. has again come under fire for allegedly concealing technical and financial realities in the now-defunct Confirm reservation project.

Budget Rent A Car Corp. has filed suit in state court here against AMR and its AMR Information Systems (AMRIS) subsidiary. It is seeking more than $100 million in damages for AMR's failure to develop a state-of-the-art travel system.

AMR was the development partner in Confirm, which fell apart last summer at the hands of insurmountable technical problems.

20-20 hindsight

Budget noted in its suit that "in retrospect," AMR provided "a sobering, early indication of things to come" when it did not assign its heralded Sabre crew to develop Confirm but instead "hired a large group of outsiders."

Fingerpointing

AMR sued its three partners, Budget, Hilton Hotels Corp. and Marriott Corp., in October 1992, alleging they caused Confirm's failure by withholding funds, making poor staffing assignments and withdrawing prematurely. Marriott and Hilton countersued in separate actions similar to the new Budget suit filed by its BRAC RPS, Inc. subsidiary.

"AMRIS and AMR repeatedly made false representations to BRAC and the other defendants that the Confirm project was on schedule and would be delivered within budget," BRAC alleged.

AMR and AMRIS "concealed from its partners the difficulties it was experiencing," Budget claims, noting that this caused "BRAC and the other user partners to continue their payments, commitment and reliance upon the expectation of timely completion of the project, long after either AMR or AMRIS had any real hope that the project could be accomplished."

Budget also cited AMR for mismanagement, incompetence and a poor choice of development tools and methodologies.

As in the Marriott suit, BRAC cited as evidence of a cover-up some of AMR's own references.

For instance, Budget referred to a letter from AMR Chairman Robert Crandall to BRAC "in which Crandall conceded that AMRIS' employees had lied about the sta-

Budget cites *a letter written by AMR's Max Hopper as evidence of a cover-up*

tus of the project and that AMRIS was at fault for the failure of Confirm."

It also cited a letter written by AMR Senior Vice President of Information Systems Max Hopper to AMRIS employees stating that "some people who have been part of Confirm RS management did not disclose the true status of the project in a timely manner" [CW, Aug. 10, 1992].

AMR declined to comment, referring inquiries to the language in its countersuit.

Travel firms rush to avert cutoff

CONTINUED FROM PAGE 1

years old. AMR has run the mainframe-based North system since 1989.

The Confirm project crumbled last summer amid allegations that AMR covered up technical problems [CW, Aug. 10, 1992]. Budget recently added its own voice to those charges (see story above).

Discussing commitment

The two sides are now haggling over whether AMR is committed under its contract to continue supporting North beyond May 15 should Hilton and Budget not have new provisions in place. AMR quietly sent termination notices last October.

Last week, an AMR spokeswoman said the extension question "is not settled," although she added, "we do expect that date to be extended."

Aprati also said the extension is an "open question" but added that AMR has not indicated to Budget that it is willing to stay on.

Meanwhile, with Confirm in shreds, Hilton and Budget have been left with North supporting them while they search for new partners to take them to a next-generation system.

The AMR spokeswoman said AMR terminated the arrangement because it was not profitable. However, Aprati said, "Maybe they just had a change of heart after we got in the controversy with the failure of Confirm. Maybe they thought there was enough bad blood."

Aprati said AMR never gave Budget a reason for the termination. He characterized as "not plausible" the explanation AMR gave that it was not making money running North.

Request for help

Sometime around the beginning of this year, Budget and Hilton sent out a request for proposals (RFP), seeking someone to take over near-term processing of North, Aprati said.

Ironically, AMR is one of several companies to which Hilton and Budget sent requests.

Aprati said one reason the rental car company would consider AMR is that Budget is simply looking for a short-term arrangement until it finds a next-generation partner. Going with AMR again under a restructured deal would eliminate the costs and headaches of changing horses.

Budget has talked about longer term possibilities with Electronic Data Systems Corp. [CW, Aug. 17, 1992] and is believed to have sent EDS an RFP on the near-term project.

Hilton has discussed possibilities with several vendors, including Anasazi, Inc., a Phoenix-based provider of Unix-based reservation technology and services, according to Anasazi Chief Executive Officer Tom Castleberry.

Anaszi was recently acquired by New York-based outsourcer First Data Corp. (see story page 4).

The AMR spokeswoman said AMR's AMRIS subsidiary is a "finalist" on Hilton and Budget's list for the near-term solution.

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that adapts to multiple environments.

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HEWLETT PACKARD

Tougher computer crime laws sought

By James Daly
WASHINGTON, D.C.

The U.S. Department of Justice has proposed new sentencing guidelines aimed at cracking down on electronic bandits convicted of stealing credit history reports, pilfering telecommunications services and peddling stolen passwords.

The new rules were designed to shift the current computer crime sentencing yardstick away from its focus on monetary damage and toward consideration of the larger reverberations of the misdeed. The result could be stiffer fines and jail sentences for convicted criminals.

The Computer Fraud and Abuse Act of 1986 subjects violators to fraud punishment guidelines that rely heavily on the victim's dollar loss. But Justice Department officials said it is just as important to factor in issues such as the harm that occurs when data confidentiality and integrity are compromised.

"We're saying that computer crime is a unique offense that not only has monetary consequences but can invade personal privacy and even compromise national security," said Roger Pauley, director of the office of legislation for the criminal division of the Justice Department.

For example, illegal access to consumer credit reports or individual passwords poses potentially serious intrusions into privacy. Illegal intrusions into computers that control telephone systems may disrupt normal telephone service and present hazards to emergency systems, neither of which is readily quantifiable.

Consultants said the Justice Department's focus on data privacy issues is a good one and could encourage those who have been invaded by computer criminals but suffered little financial loss to come forward.

"Data has become a very real currency, and the requirements for keeping it private are essential in such institutions as banks," said Robert Kane, a partner at Intrusion Detection, Inc., a New York network and security consultancy.

Each case different

Critics contend that the idea of strict punishment guidelines, which were instituted on a federal level in the 1980s as a way to prevent arbitrariness in sentencing, do not take into account the vagaries of each case.

"One of the best things we see in computer crime cases is that judges have a lot of autonomy in sentencing, and I'd hate to see that lost," said Mike Godwin, legal counsel for the Electronic Frontier Foundation in Washington, D.C.

The sentencing proposals, however, are expected to remain little more than paper tigers for at least a year until the U.S. Sentencing Commission examines computer crime more closely, said Paul Martin, the commission's deputy staff director. "This issue [of computer crime] is clearly on our screens, but we need to give it more thought and analysis," he said.

A commission study group should be in place by June and will come up with recommendations next year.

The sentencing commission recently scheduled a public hearing on the proposed amendments and is expected to report its findings to Congress by May 1.

Lawmen said changes are needed because the current statute has simply been outrun by today's electronic breakthroughs.

"Criminal laws need to reflect technological advances," said Scott Charney, head of the Justice Department's computer crime investigation unit. "Unfortunately, technologies move faster than the laws, and some of the statutes are out of date."

Charney has called for a wide-ranging update of the computer crime statute. Among his proposals is a forfeiture provision that would allow the government to confiscate the defendant's computer and other property used in the commission of the offense.

Charney is also helping draft legislation that would criminalize the increasingly common practice of planting viruses in apparently legitimate programs and mailing them to companies, which then insert them into their machines.

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Annual software update

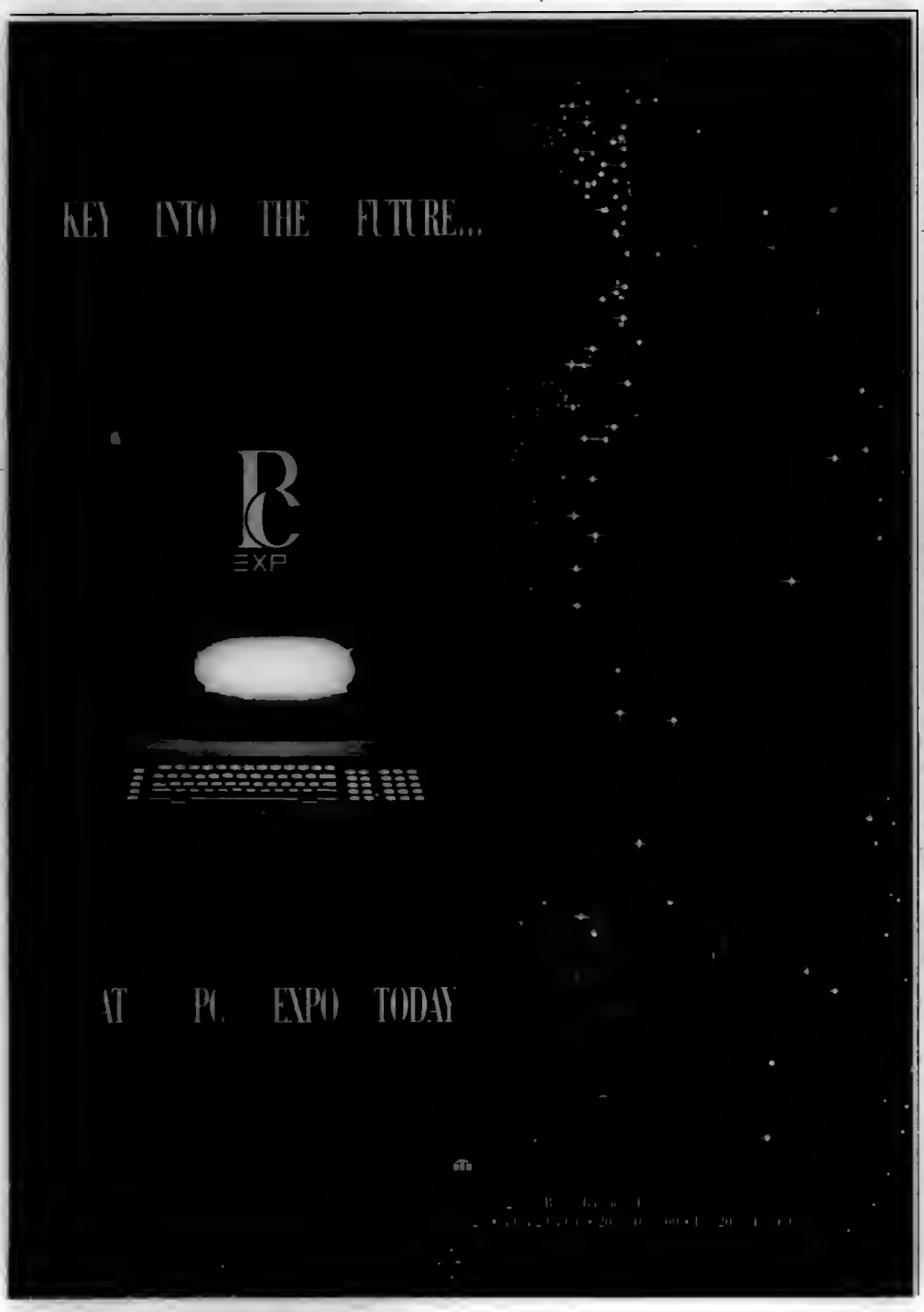
SAS to roll out updated products

By Gary H. Anthes
CARY, N.C.

SAS Institute, Inc. will announce this week general availability of a new version of its products for information management, retrieval, analysis and presentation.

In the company's largest rollout ever, SAS Release 6.08 is being shipped to 12,500 customer sites running IBM's MVS, CMS, VSE and OS/2 2.0; Digital Equipment Corp.'s Open VMS; and Microsoft Corp.'s Windows 3.1, according to the company.

The new release, which for the first time promises easy portability of SAS applications across diverse environments, contains new products, new product features and substantially improved performance, users said.



James Brink, information technology manager at Chevron USA Production Co. in Houston, said he had the previous release of SAS for the desktop — SAS 6.06 for MS-DOS — but never used it partly because it was too slow.

However, Brink said Chevron has been using a beta-test version of the new release to move SAS applications from a mainframe to a Windows-based client/server environment. "We moved the catalogs down, changed the data directories, and everything rolled right along and kept on working," he said.

"This allows us to develop an application on a PC and migrate it to a mainframe for production," said Dave Gardner, catalog control system development manager at JC Penney Co. "Before, we couldn't upload and download directly; that has all been fixed under this new release."

Product highlights

SAS says highlights of its new software release include a product for building and maintaining executive information systems, enhanced client/server capabilities and enhanced application development capabilities across platforms.

Robert Johnson, manager of acute care systems at Health Span Systems Corp. in Minneapolis and a beta-test user of SAS 6.08 for MVS and OS/2, said he likes a new feature that allows file sharing so that one user can access a file while it is being updated by another. He said SAS now runs noticeably faster — perhaps by 30% to 40%.

But Elaine Oaks, documentation librarian for the state of Utah, said the desktop improvements come at a price. "It works well, but it is a hog. It takes 10M bytes of memory. Several people have had to buy more memory."

Lynne Harris, SAS' desktop product manager, said SAS for Windows and SAS for OS/2 will run on Intel Corp. 80386 machines, but she recommended one with an 1486 processor and 6M to 12M bytes of memory.

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- **SAS/Lab**, for "suggestion-driven" data analysis.
- **SAS/Ph-Clinical**, for clinical data analysis in the pharmaceutical industry.

Harris said 86% of SAS' 3 million customers will be affected by the new release. The balance are mostly SAS Unix users who will get their next production release by year's end. That release will also include SAS for Microsoft's Windows NT, she said.

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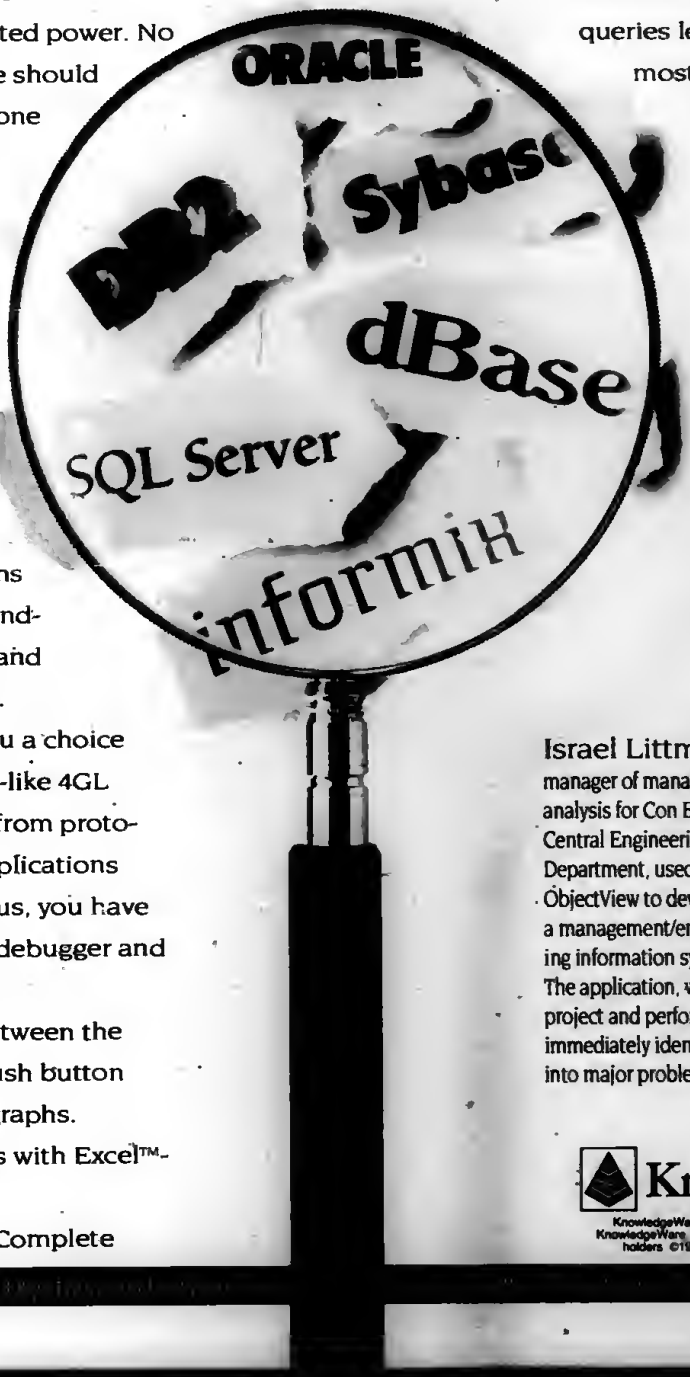

Israel Littman, manager of management analysis for Con Edison's Central Engineering Department, used ObjectView to develop a management/engineering information system. The application, which accesses budget, resource, project and performance data, helps managers immediately identify exceptions before they turn into major problems.

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The COMPAQ Contura 4/25CX comes with an EasyPoint trackball that eliminates the need for a mouse. And all of the Contura models offer a unique feature called

4/25CX: *Active color VGA ◆ Integrated EasyPoint trackball ◆ NiMH battery ◆* **4/25c:** *Advanced passive color VGA ◆ COMPAQ Trackball ◆ NiMH battery ◆* **4/25:** *Monochrome VGA ◆ COMPAQ Trackball ◆ Enhanced NiCd battery.*
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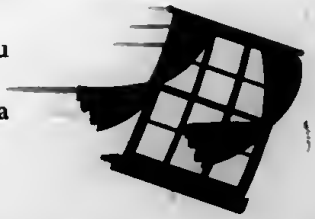

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*Nothing is backed like a Compaq because nothing is built like a Compaq. Contura includes a free three-year, worldwide warranty with a year of on-site** service in the US or Canada.*

COMPAQ

*In tests run by Compaq using *PC Magazine* Labs WinBench Release 3.1 **This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

Tech Talk

Virtual tool

IBM's Virtual Worlds Group unveiled an application development tool kit for virtual-reality environments. Scientists at the IBM group, which was formed in 1989, said the modular VR Toolkit marks the culmination of their efforts to date. The scalable Unix tool kit provides modules for building virtual-reality environments. Modules can be modified, even while the application is running, until the user finds a suitable configuration for a particular VR application. The tool kit is not yet commercially available.

Parallel pass

Boston University's Center for Computational Sciences is providing undergraduate students with direct access to parallel supercomputing in the hopes of exposing a new generation to this computing paradigm early in their careers. With support from the National Science Foundation, it has introduced a new interdisciplinary curriculum in massively parallel computing. Students will work on an 8 billion floating-point-operations-per-second Connection Machine CM-5 supercomputer from Thinking Machines Corp. in Cambridge, Mass. The CM-5 is also being used by more than 300 university researchers in a dozen different departments.

Computer gin

The world's only fully computerized cotton-ginning system has been developed by W. Stanley Anthony, an engineer at the U.S. Department of Agriculture in Stoneville, Miss. Current ginning methods give all cotton the same amount of cleaning, but Anthony's customized system puts the raw cotton through only the steps needed to clean a specific batch, which reduces energy use and fiber damage. The computer considers cotton moisture, trash content, color and prices to calculate ideal ginning conditions.

A new method of seeing?

Users explore visualization's potential in commercial sector

By Ellis Booker

WHY DO SNAPSHOTS taken at the Grand Canyon never seem to capture its beauty?

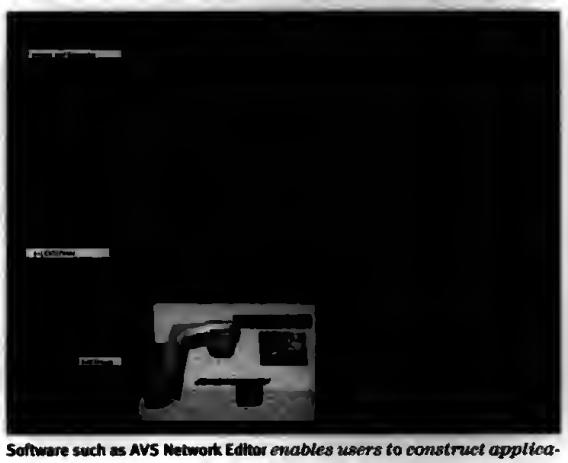
One simple explanation has to do with what might be called the "bandwidth" of the two experiences. To stand at the rim of the canyon is to have every sense flooded with information, but to view a two-dimensional representation of the scene later is, in terms of bandwidth, a far narrower experience.

Developers of visualization systems attempt to harness human beings' capacity to absorb multiple types of incoming information simultaneously.

If translated into symbols, graphics or other representations, massive amounts of data can be appreciated and understood. Even more important, relationships hidden within these data sets can be revealed through visualization.

This is where visualization is distinct from simulation, a close relative. The goal of simulations is a precise and accurate model of the single event; visualizations, however, attempt to extend comprehension, sometimes at the expense of a realistic simulation. For instance, in a visualization on the electrical potential racing across a cat synapse, the researcher used changing volume, in the form of a symphony, to indicate changes in one electrochemical variable.

Until now, however, this emerging technique, which some believe might unleash the full potential of human/computer interaction, has had a small scientific audience.



Software such as AVS Network Editor *enables users to construct applications to view their data using any mix of visualization techniques*

But the promise is enormous, said Ben Shneiderman, head of the Human-Computer Interaction Laboratory at the Center for Automation Research at the University of Maryland in College Park, Md.

"Our capacity to perceive patterns is enormous, and I believe [the computer industry] has inadequately attended to that," he said at the eighth annual ACM Computer Science Conference earlier this year. "We still have the legacy of the teletype and the fantasy of [artificial intelligence]."

Why hasn't visualization taken hold in commercial settings? The reason is twofold: To make visualization systems work requires the collection of raw numerical data and an intuition about how the data interacts — the two common aspects of a "scientific" approach.

"Commercial environments are a little more complicated, since you're more interested in decision-making and trends," agreed Charles Kreitzberg, president of Cognetics Corp., a Princeton, N.J.-based company specializing in the design of user interfaces.

Part of the blame also rests with generally unreceptive IS departments, he said.

In addition, scientists as a group are ahead of their commercial counterparts in their use of powerful workstations and the building of simulations. Easier-to-use visualization tool kits may help end users build or modify visualization systems and get on with understanding the data at hand.

A final, mundane reason why visualization has not become more widely accepted has been the cost of access, according to Hambleton Lord, director of product marketing at Advanced Visual Systems, Inc. (AVS) in Waltham, Mass.

"A couple of years ago, doing 3-D graphics required a $30,000 [workstation]," he said, noting that the newest generation of microprocessors from Intel Corp. will bring this capability to desktop PCs.

The vast majority of AVS' customers are scientific or industrial concerns. Lord hints that a handful of them, including banks, are playing with the technology.

"They feel if they can understand the market and make a trade 30 seconds ahead of their major competitor, that's an advantage," Lord said.

Testing the interface

The question "How can we make the next-generation computer interface" follows Ben Shneiderman wherever he goes.

As head of the Human-Computer Interaction Laboratory (HCIL) at the Center for Automation Research at the University of Maryland in College Park, Md., Shneiderman has worked to turn the debates about interfaces into a more scientific enterprise.

Once a user community and a set of tasks have been decided on, Shneiderman said he believes the following measurable criteria for the effectiveness of a human/computer interface can be applied:

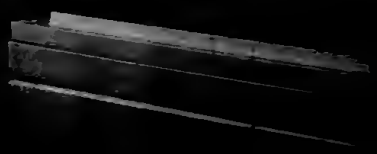
- **Rate of human errors.**
- **Time to learn specific functions.**
- **Speed of task performance.**
- **Subjective user satisfaction.**
- **Human retention of functions over time.**

Overall, however, interfaces have been "stalled in the 1984 valley," he said, referring to the year the Apple Computer, Inc. Macintosh was introduced.

HCIL's own projects point the way toward different conceptions of the interfaces.

For instance, the laboratory has developed an application it calls the "Home Finder," which uses sliders, buttons and attribute values to help a user "see" the distribution of houses on a map around Washington, D.C. — ***Ellis Booker***

All for one? One for all.



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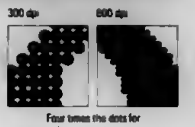

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"Why I

Patrick Pearce, Software Developer, Life Care Development Corp.

"Time is money."

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In the Workplace Shell,™ you can edit source code files while compiling and debugging in the background.

don't do Windows anymore."

The no-comparison comparison chart.

	Windows 3.1	OS/2
Virtual memory limit	4 x physical	512MB (disk space)
Memory model	Segmented (64KB)	Flat memory objects
APIs	16 bit	Full 32 bit
Multitasking—DOS apps	Time slicing	Pre-emptive time slicing
Multitasking—Windows/PM apps	Cooperative	Pre-emptive
Priority	Static (set by user)	Dynamic
Dispatchability	Process	Thread
System services	Serial	Parallel
Protection between apps	Unprotected	Protected
Kernal protection—DOS/Win/PM apps	Unprotected	Protected
File system	FAT	Enhanced FAT and installable file systems (HPFS, CD-ROM)
User interface	Windowed	Object oriented

the 64K code segment barrier and convert to a flat memory model with up to 512MB of memory per session for writing code. "Writing is easier and faster than ever—and bugs have never been easier to uncover and zap."

"I'm actually having fun again."

But the best reason for leaving Windows and other DOS extenders is the opportunity to develop truly revolutionary OS/2 applications. You could say OS/2 has closed the door on Windows. For the free white paper on why OS/2 is the developer's platform of choice, or for more information, call 1 407 982-6408.

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Ghost image

The imaging industry's biggest show gets under way in Chicago today amid a burning question: Will imaging technology ever become all it's been cracked up to be? Or do we have another artificial intelligence-like paper tiger by the tail?

This much is known: After getting a jump-start from the re-engineering craze, imaging technology has started to fade in the eyes of top-line IS managers as a key emerging technology. In its annual survey of more than 400 North American chief information officers, CSC Index watched imaging systems sales plummet following three consecutive years of growth. The percentage of respondents listing imaging as a key emerging technology dropped from 49% to 29%. Among European CIOs polled by CSC Index, imaging fell from 28% to 19% of the sample.

In recent years, the only other technology on the survey to get as hammered is computer-aided software engineering (CASE). The pummeling of CASE mirrored widespread disenchantment with its unfulfilled promises, sending the CASE vendors scrambling for cover, after which they re-emerged, calling themselves client/server companies or solution providers. Geez.

I believe that imaging technology need not suffer the same fates as CASE or artificial intelligence and that the current waning interest will improve over time. My main reason is that the promises of imaging are real — the ability to redesign work flow, vastly reduce paper files, greatly speed up access to archives and generally reduce office automation expenses.

At this point, it seems users are reacting to the legacy of the early image vendor pioneers. It's not that their systems were expensive (they were), nor that they failed to deliver as promised (many early users reported excellent results).

Instead, they were afflicted with the "P" word — as in proprietary. If you were willing to buy into the religion of most of the early providers lock, stock and barrel, you too could have lived the imaging dream.

However, the ground rapidly shifted in the last years, and the hue and cry of open systems and interoperability began to overwhelm the proprietary world. Proprietary became a very dirty word and quickly soiled all with which it came into contact, like imaging.

So the big news today is not just that the price of imaging is falling dramatically, by better than 50% in the last two years (see CW Guide page 81). Rather, the industry is now catching up with the underlying dynamics that are driving it.

Bill Laberis

Bill Laberis, *Editor in chief*

Dear Abby

The article "Rethinking re-engineering" [CW, March 15] might have been OK if it appeared in a Dear Abby section of the newspaper. I could not help but shed a tear for the IS executives who discovered that "huge [re-engineering] projects are very tough."

Dear Abby's counsel to those poor souls was to take on smaller jobs so if they fail, no one will notice. Doesn't this advise them to leave significant business change up to functional managers and get back to their bits and digits?

The difference between how functional and IS managers think about re-engineering is simple. IS thinks about re-engineering in terms of "projects." They gauge their involvement in re-engineering by whether they have one, two or 10 projects going on and whether those projects are big or small.

Functional management, on the other hand, thinks of re-engineering as a "business process." They think about whether their re-engineering process works or not, that is, makes a difference in revenue and costs.

Challenging the concept of re-engineering is like challenging the concept of marriage. Marriages don't fail because marriage itself is a bad idea. They fail because those involved do it wrong.

You must challenge your re-engineering process. If you fail, you either used a bum re-engineering process or you did it wrong. And, if you fail, the next section of *Computerworld* that you should read is the want ads.

Daniel S. Appleton
D. Appleton Co.
Manhattan Beach, Calif.

Why the hype?

I haven't figured out why everyone is getting so excited about Windows NT, Microsoft's most visible software development effort. It will end up being a graphical user interface (GUI) tool on top of the Unix operating system. Doesn't anyone have the nerve to tell Bill Gates there already are GUIs for Unix?

Many people bought into the Windows concept for DOS 10 years ago. But today, true multitasking, interoperability and mainframe accessibility are a must. Windows NT doesn't address these operating system requirements.

Once corporate IS realizes that IBM's OS/2 is the operating system that meets their needs, the Windows NT effort could end up being the biggest failure in software history.

William T. Voris
Troy, Ohio

Happy with 3.0

I feel I must respond to the comments made by Bruce J. Muckian in his commentary "Windows: Calling it awkward would be kind" [CW, Feb. 22]. I work for a county agency that has suffered a 30% loss in revenue for fiscal 1992-93 and will probably be faced with another deep cut for the fiscal year that starts in July. We are working desperately hard to avoid layoffs, furloughs and/or pay cuts.

One way we are saving money is by limiting the amount we spend on computing upgrades (software and hardware). We never had a Windows 3.0 problem because we bought only one copy after 3.1 came out. Even now, less than 10% of our micros have Windows.

We resent the obvious snobbery demonstrated by some of the letters printed in your paper [CW, March 15]. Not everyone has the cash flow that would allow chasing technology and buying the latest and greatest toys available.

Edward M. Gallagher
Riverside, Calif.

Tariff truth

"AT&T: Feigned altruism?" [CW, March 15] appears to imply that a decision not to require the tariffing of enhanced services was based on a desire to promote the "health" of the industry. There's more to the story.

Although the FCC considered competition in the enhanced services industry when it determined what regulatory regime to apply, the FCC also deemed the offering of enhanced services not to be common carriage. The Communications Act of 1934, as Ms. Wexler notes, requires the tariffing of only interstate common carrier communications services.

Susan J. Bahr
Washington, D.C.

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We all owe IBM – and IS owes it an apology

George Gowen

When I graduated from college back in the early 1970s, I had an offer to work at IBM. I turned it down because I wanted to develop application software, not sell computer hardware or software. Today, I look back on that decision with some regret.

IBM has provided the computer community with not only a vast array of computer products but also a standard for quality, service, marketing and research.

Remember those guys with the three-piece suits, white button-down collared shirts and wing tip shoes? Yes, IBM had a standard for everything from dressing to managing projects and beyond.

Oh sure, there were times when you wanted to strangle your IBM marketing support rep and wished that IBM would roll over and die, but no single company has done more for computing than IBM has. Look at all the hot computer companies of today. Most of them got started based on an IBM white paper, or an ex-IBM employee, or by setting a goal to be better than IBM in a particular field.

Don't get me wrong — I don't believe IBM or its employees walk on water or created the world, but you must admit they've been instrumental in shaping the computer world as we know it.

Now everyone is wondering what IBM should do. I believe what it needs to do is step back in time to the days when its business clients were its best friends. IBM got its start listening to the back office and manufacturing needs of its clients. It provided marketing, service and other support teams to help the client company establish computer environments to meet those needs. In turn, the client companies built organizations (IS departments) to interface with IBM. While these organizations could understand "IBM-ese" and helped with the computerization of the company, they became a major part of IBM's problems.

At first, IBM was meeting directly with its clients' businesspeople and the IS departments were confined to a support role. As time went on, IS departments grew in size and responsibility to the point where IBM was no longer talking with businesspeople but instead listening to an IS person's interpretation of the company's needs.

The IS departments saw PCs as threats and banned them from the corporate environment. But the businesspeople did not agree, and the PC took hold. All this time, IBM was being told by the IS departments not to fear the PC movement because they still had control over the computing needs of the company.

Needless to say, by listening to the IS departments, IBM lost out in more ways than one. As a result, it came late to the PC movement — so late that even OS/2 could not make the same impact on PC users that VM and MVS had made on mainframe users. And the business community became convinced that IBM was only a mainframe player.

Big Blue is gone. IBM is still here and will be for some time to come. And what the company needs to do is re-establish its ties with business users, with the IS departments taking a back seat.

Gowen is chief executive officer of Boca Raton, a financial software development company in Fremont City, Calif. His company sometimes competes with IBM and develops software for a variety of platforms.

What IBM needs is a little TeamFocus

OPEN MIND *by* Esther Dyson

DEAR MR. GERSTNER:

You'll be getting lots of advice, so let me put in my two cents' worth.

There are many things to discuss, including markets and marketing strategies, corporate hierarchy and decentralization, technology leadership and competitive advantage. But basically, IBM's problem is internal management. Yes, the markets have changed, but the issue is IBM's ability to respond to those changes.

So here I'd like to talk about how to get the background information to assess IBM and a software tool for doing so — a tool that your own company is actually selling. It's called TeamFocus. You resell it for its developer, Ventana Corp. in Tucson, Ariz.

Unfortunately, your company uses this tool only for tactical, nuts-and-bolts tasks such as designing new products. You could make good use of it, however, as you tackle the job of designing a new company. (There's no hope of rebuilding IBM as it once was; the world has changed.)

What TeamFocus does is help increase the level of free expression in meetings. The tool lets people participate in meetings anonymously, and it lets more people participate. They sit in a meeting room or on a distributed network and type in their comments, answers and thoughts in response to the meeting leader's questions and prompts. Because they are making their comments anonymously, people feel freer to be honest.

I believe in allocating tasks properly between computers and humans — and I'm not bedazzled by the technology — but such software tools can have an impact on a very human factor: fear. In part, it is fear that has kept IBM from change — fear of upsetting one's boss, fear of being out of line, fear of new ideas, fear of failure. The very success of IBM's culture in the past has made its people afraid of voicing doubts, airing problems, disagreeing with accepted wisdom.

Users have found that wisdom, new ideas and hidden knowledge of problems tend to surface more rapidly with this approach. Some managers can't take it. I talked to one company that had stopped using a similar product precisely because its managers didn't like what they were hearing from their employees.

But your job is to find such things out, and as a newcomer, you should be able to hear the bad news without becoming defensive. In addition to finding out a lot, you'll give your employees a greater sense of participation. People who were scared to say anything will be free to talk without risking their careers.

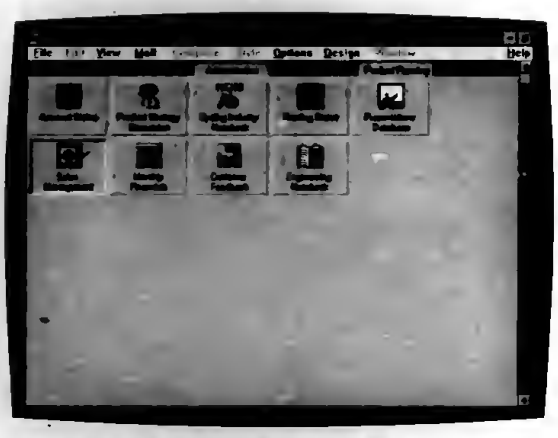
You might try this with customers, too — not just with senior employees at your flagship accounts, but with junior employees who use the products senior people buy, and with small accounts that don't get priority treatment. You should also go after people who aren't your customers and analysts who aren't recommending your products or your stock.

I'm not suggesting that you need consensus management — it's almost precisely the opposite. Consensus tends to uphold the existing power structure. It tends to squash new ideas and bad news. You need to find out a lot, rapidly, from people who might be afraid to tell you. You need new ideas and unpopular opinions.

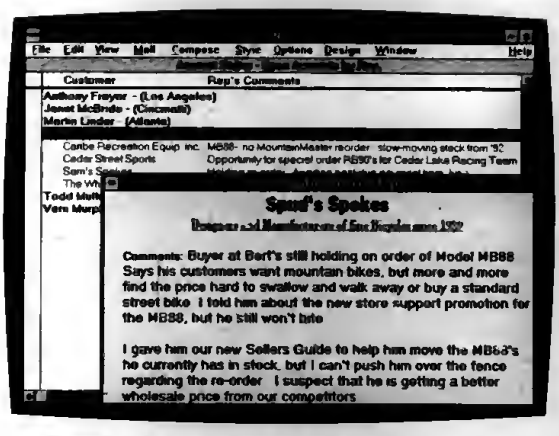
Then, Mr. Gerstner, you need the courage to make up your mind.

Good luck.

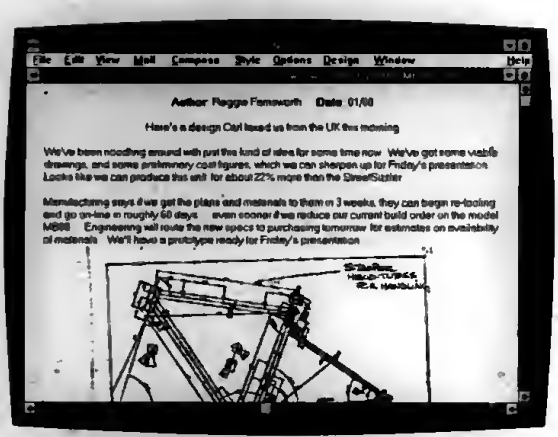
Dyson is editor of "Release 1.0" and "Rel-EAST," newsletters on new technology and new computer markets in Eastern Europe.



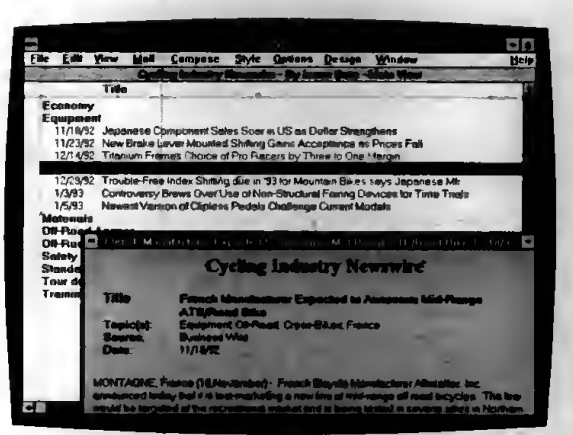
1. This is Michelle's Notes desktop. Each icon represents a different Notes application. She uses these to work with people all over the world including the field sales team, manufacturing, engineering, R&D, key customers and senior management. She regularly scans activities in the field by double clicking on ACCOUNT STATUS



2. Today, she notices a number of entries regarding a slow-down in closing first quarter reorders for their most popular model, the MountainMaster off-road bike. It seems the market for this high-priced bike is beginning to dry up. This could be a major problem.



5. The next morning she checks into the DISCUSSION database and this time finds an entry from Reggie in R&D. Reggie had also read Jim's message and is responding with a possible solution his people have been playing with. He pastes in an autocad illustration faxed to him from the U.K. using a Notes incoming fax gateway



6. With a presentation on Friday, Michelle gets down to some quick market research by opening up the CYCLING INDUSTRY NEWS database. An organized source of live industry data, it provides a news report on a French company that has a couple months head start developing a hybrid bike.

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Michelle Cliffington is a product manager for a bicycle manufacturer. She's responsible for all product planning, market research and marketing activities for her product line. Notes helps her shift gears and rush a new product to market.

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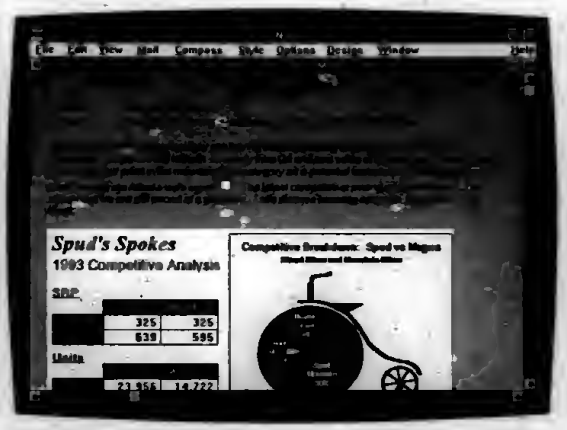
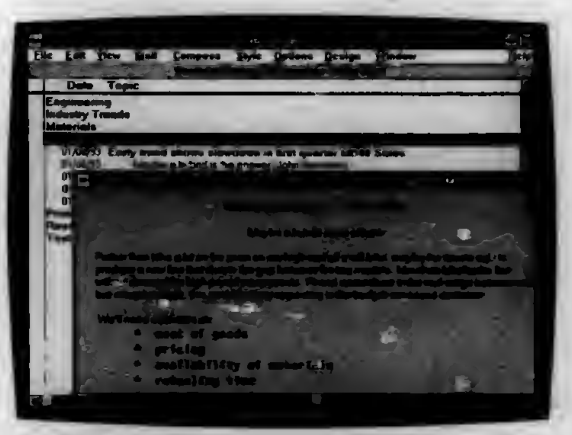
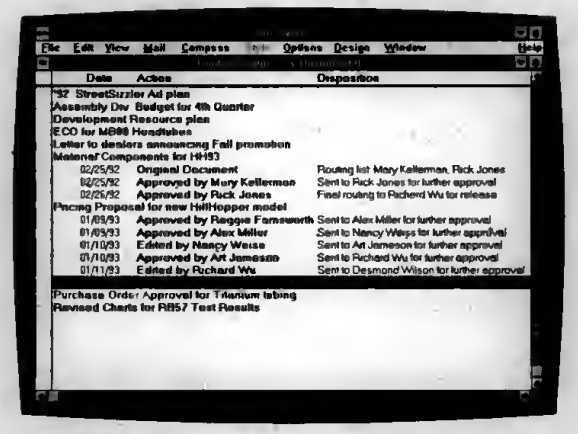


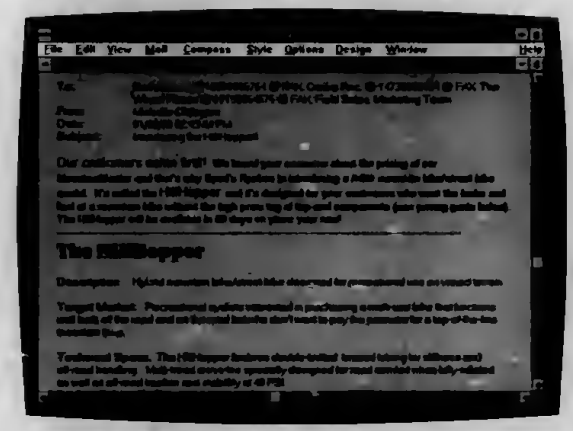
3. She decides to recommend a price-reduction and double clicks into the STRATEGIC PRODUCT DISCUSSION database. This provides an organization-wide forum to discuss issues and brainstorm solutions. She links the report from the Atlanta rep directly into her Notes document. Then she uses DDE to embed some 1-2-3® charts into her document as well.



4. Later in the day she re-enters the DISCUSSION database looking for responses. Her boss, John, has logged on from his hotel room in San Francisco. Rather than cut the margin, he suggests she explore the feasibility of adding a mid-priced bike to their line. He wants an initial presentation for Friday.



7. A few days after routing her proposal to the product team, she wants to find out where it stands within the organization. She opens the ROUTING STATUS application to find that it has worked its way through the organization to Desmond, the senior decision-maker, and has been finally approved. So she's on her way.



8. Michelle closes the loop by communicating the news to their customers. Double clicking into the CUSTOMER FEEDBACK database, she faxes a memo directly from Notes to all retailers. In it she explains that the company has heard their problems and responded with the Hill Hopper. And with delivery in 60 days, they can order now.

can respond with
h Michelle shift gears.

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Charles Babcock

Selling Unix in a PC way

For the first time, a PC-based company is pushing Unix toward the desktop. Borrowing a page from Johnny Appleseed, Novell is trying to propagate copies of UnixWare, its trimmed-down version of Unix System V, across thousands of Intel-based PCs.

UnixWare is a hardworking, 32-bit operating system with a standard GUI. It works in tandem with both a NetWare LAN and TCP/IP. And clearly, Novell believes that if enough UnixWare can be dispersed, the field will be prepared for client/server computing based on Unix and NetWare.

With UnixWare, Novell shrank System V down to PC proportions. Now it is sending its sales force into the field to spread the news that pricing has also been downsized, dropping from $495 to $249 on the client and $2,495 to $1,295 on the server.

The authors of this strategy are Kanwal Rekhi, executive vice president of Novell's Unix products group, and Joel Applebaum, president of Univel, a Novell subsidiary in Sandy, Utah, close to the parent company in Provo. They have absorbed the lessons of the desktop marketplace the hard way. Rekhi, the founder of Exelan, which was acquired by Novell in 1989, helped Novell survive challenges to its LAN predominance by both IBM and Microsoft. If there is one thing he has learned, it is that there is strength in numbers.

Applebaum has watched the various members of the Unix community engage in fratricidal competition while the hypergrowth of PCs threatened to pass it by. "It seemed to me Unix was missing the boat. Some people were urging Unix Systems Labs [USL] to do its own version of Distributed Computing Environment [middleware being assembled by the Open Software Foundation]. We didn't need to do that."

Instead, for $249, Novell is offering UnixWare with the capability of running MS-DOS, Windows and Unix applications. UnixWare consists of the Destiny desktop version of Unix developed by USL; Digital Research's DR DOS owned by Novell; and Microsoft's Windows Merge, which allows UnixWare to support Windows 3.0 and 3.1 applications. Everything is geared to plug and play with the Novell NetWare LAN.

DREP, AWK and other Unix commands not needed by the end user have been thrown out. The load of fonts has been stripped down and the software developer's kit has been broken out as a separate product, yielding a lighter, firmer Unix.

Coming together

Whether this kernel will take root remains to be seen, but for the first time, all the pieces are in place for what could be called a Unix desktop strategy.

The strategy is not yet fully articulated, but Rekhi said server-based Unix will remain an open system with input from many participants. On the client side, Unix will be driven by the direction that Novell wants it to go, not by committee, and Novell will listen carefully to what end users want, he said.

The leading Unix vendors recently got together behind standards that brought application programming interface unity to Unix. If effected, this will allow a customer to move from one brand of Unix to another by recompiling applications. But PC users want binary-level compatibility, like that which exists in the MS-DOS and Windows markets, with no need to recompile.

Rekhi said he believes the only way to generate binary compatibility in desktop Unix is through numbers — big numbers to attract software developers to a common denominator, workhorse system. This may sound like a backward way of setting standards, but it is the way things have always worked in the PC arena.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

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Hardware hinders pen market

Users anxious to deploy systems, but hardware scarce and rudimentary

By Michael Fitzgerald

■ If vendors build pen systems, will users come? The answer seems to be yes, but vendors appear hesitant to take the bait.

"Everybody's waiting for hardware," said John Katich, president of Access International, Inc., a field sales force automation reseller in Lansing, Ill., that has six customers who have ordered units and cannot get them.

Currently, only a few of the industry's big-name vendors have followed Grid Systems Corp. into pen computing, and of those, only NCR Corp. is widely credited with being able to ship products on demand.

The other players, notably IBM PC Co., Toshiba America Information Systems, Inc., NEC Technologies, Inc. and Fujitsu Personal Systems, Inc., have experienced various problems getting their first units out the door.

Toshiba, for instance, can make its DynaPad, but the Japanese parent refuses to ship systems until Go Corp. fixes a problem with its drivers for Personal Computer Memory Card International Association sockets.

Overall, though, hardware problems rather than software problems, have delayed users from deploying or even piloting pen projects in many cases.

"For IBM, Mitsubishi, Toshiba, NEC — either evaluation units aren't available, or they don't have someone to come by here," said Al Lake, computer systems specialist at the Association of Oregon Counties in Salem, Ore. According to Lake, NCR and start-up Tusk, Inc. let him see systems but would not leave a unit for evaluation purposes. He said that despite his interest in purchasing 75 units, only Grid had pursued him aggressively.

Hands are tied

Some users want to deploy pen systems, perhaps in the hundreds of units, and cannot.

"I have enough critical mass in software to go forward and I am just waiting for hardware, like I have been for a year," said William Tsang, manager of medical systems at Pfizer, Inc.'s U.S. Pharmaceuticals Group.

Tsang said his group would like a 486-based system or a system based on AT&T's Hobbit chip. He said he thinks these systems will hit the market in the next quarter.

Most observers said the first-generation hardware available today is simply too crude to spark the market. According to Katich, the hardware is too heavy and runs the software too slowly. His company develops applications in Communication Intelligence Corp.'s relatively lean PenDOS environment.

"PenPoint tends to be exceedingly slow in the 386 environment, and Windows for Pen is only a little better," said William Lempesis, publisher of "Pen Vision News" in Pleasanton, Calif. "Most users doing pen applications would rather have 486 machines or maybe Hobbit machines."

Others said the problem with pen computing will not be solved this year. "I don't think we're one 5-pound 486 [pen machine] away from the market exploding," said Joseph Schoendorf, a partner at Accel Partners, a San Francisco venture-capital firm.

While vendors with 386-based systems may be behind the times, the pen market has not worked the same way as others. For example, the 8088-class GridPad remains the best-selling piece of pen hardware and small handheld systems based on less-than-cutting-edge processors are expected to drive the pen market.

Lempesis Research in Pleasanton, Calif., said 45,000 pen systems were sold in 1992. 144,000 units will sell this year and 362,000 units are expected to sell next year. By comparison, market research firm Infocorp in Santa Clara, Calif., placed the total mobile computer market at 6 million units in 1992.

Chasing the chef

One of the nation's Top 50 food-service distributors is looking to pen computing to give its sales a boost.

"In our industry, the first wave of automation was laptops, but we didn't jump into the full laptop experience," said Blair Labatt, president of Labatt Food Service, Inc. in San Antonio. "There's a certain rhythm to a sales call, and we felt [note-books] distracted from that. We were also looking for a truly mobile device, something so they could chase the chef around the kitchen."

Currently, Labatt's top sales rep is testing a pen-based system using OrderWriter from Access International. Labatt said the rep has cut two to three hours of administrative work out of his day with the pen-based system. The company will purchase 50 units by the end of the year.

"Our application is fully functional, but we feel there's so much change taking place in the hardware that we want to wait a bit," said Tony Canty, Labatt's MIS director. Canty said his beta test is being done on Samsung's 386SX-based PenMaster, but he expects to buy 486-based units now hitting the market, perhaps IBM's ThinkPad 710T. He also said battery life of two or three hours per battery on notepads is not long enough.

Still, Labatt will not wait long to implement pen computing because it expects the technology will increase its efficiency. It will roll out several units a month.

Pen systems are "automating the way [our reps] work, rather than making them work a different way," Labatt said.

MS-DOS upgraded, but do you need it?

By Christopher Lindquist

MS-DOS 6.0 is good — very good. But what is new to MS-DOS 6.0 is not new to the DOS world, and that will limit the flow of upgrades in companies that have already found third-party solutions to their problems.

For every new utility that MS-DOS 6.0 offers, there is something, usually with more features, already on the market. Data compression, automated memory management, backup, virus protection, disk caching, file transfers, support for multiple configurations: All are available from third-party vendors.

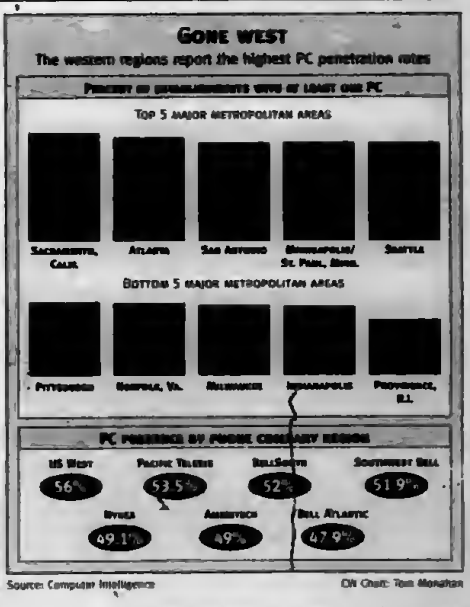
Granted, the average user buying a machine with MS-DOS 6.0 installed may no longer have to buy these utilities, and the availability will undoubtedly expand the use of these types of tools. It just remains to be seen whether this will be enough to persuade large firms to go through the trouble of an upgrade.

MS-DOS 6.0 does have one advantage over many third-party products: ease of use. The utilities are well-integrated into the operating system, and running them is generally a matter of typing one command and hitting ENTER a few times. The upgrade eliminates the most serious deficiency in MS-DOS 5.0 — getting the most out of it required users to modify their configuration files by hand, which is a recipe for trouble.

That is not the case with MS-DOS 6.0. DoubleSpace data compression does not require users to modify configuration files, and it loads with a single command. MemMaker optimizes drivers and resident programs in upper memory. Anyone using DOSKEY macros to move files and directories will not have to anymore — a MOVE command that handles subdirectories is built in. And the on-line Help files are extensive and contain command examples, syntax and notes.

What all this means is that for average users there should be fewer machines out there with 4M bytes of memory but only the first 640K being used because the user does not know how to install EMM386.EXE. It should also extend the life of a lot of hard drives by "doubling" the space (I got

MS-DOS, *page 40*



Financial firm banks on imaging

By James M. Connolly
BOSTON

Sometimes being on the bleeding edge can work out just fine.

Four or five years ago, anyone might have scoffed at a plan to go with outsourcing, imaging, client/server and OS/2 all at once. But Massachusetts Financial Services Co. rode the bleeding edge all the way to cash savings, better productivity and improved customer service.

Massachusetts Financial's James Bailey *was behind OS/2 push*

Massachusetts Financial is reaping the benefits of a companywide work-flow system based on IBM's OS/2 as a desktop operating system, an IBM Application System/400 minicomputer, local-area networks and peer-to-peer links from the desktop to the outsourcer's mainframe.

The firm had started out using MS-DOS-based client software but scrapped it in favor of OS/2 after a 90-day pilot.

"We found that DOS wasn't going to cut it and that we had to go to OS/2," said Senior Vice President James F. Bailey, who swears by the oft-criticized IBM operating system.

"I am an extremely strong proponent of OS/2. [Release] 2.0 is a true preemptive multitasking operating system. It is what someone had in mind when they developed OS/2 five or six years ago," Bailey said.

OS/2's communications manager provides the company with a core communications capability that ties the PCs to the AS/400 and, through peer-to-peer networking, to host data on a mainframe from DST Systems, Inc. The original desktop machines, IBM Personal System/2s based on 20-MHz Intel Corp. 80386 chips, are being swapped out for IBM 486SLC2-based machines with 25/50-MHz clock doublers.

Massachusetts Financial's Automated Work Distribution System and the process review that led to it have helped the mutual fund company reduce the number of business steps involved in servicing customers from 600 to 270.

Massachusetts Financial has seen an early payback on its $5 million investment and efficiencies: The company can handle its $30 billion in funds using 100 fewer employees than before.

Now Massachusetts Financial sees opportunities to build on the document management system. Bailey has his eye on voice recognition and annotation, character recognition for reading account names and numbers, on-line customer access and a telecommuting option in which customer service reps could work with the image system from home.

The system was built by DST Systems in Kansas City, Mo., which also provides transaction processing for several financial services firms including Massachusetts Financial.

That original outsourcing deal was driven by boomtown-style growth at Massachusetts Financial during the 1980s. Without adequate systems in place to handle the transaction growth, the firm "threw people at the problem," according to Bailey, and employment soared to 1,000 people.

Once Massachusetts Financial outsourced its processing to DST five years ago, its head count shrunk to about 600. Then, about the time Massachusetts Financial started looking for a work-flow system for servicing customer accounts, DST proposed a document system based on the AS/400.

Before committing to the DST system, however, Massachusetts Financial launched an internal business process review. That analysis showed that too many people were handling each business transaction. For example, a customer's request to redeem shares could involve 20 steps, 14 more than necessary.

A key to success, according to Bailey, was employee participation during the review process and the subsequent 40-workstation pilot project.

"We told them that we wanted to improve productivity, and the only way we could do that was to reduce head counts. We also told them that we were not going to lay anybody off and that any attrition would come through a managed process," Bailey said.

Massachusetts Financial plans to install a new version of the DST system that will move the core applications out of the AS/400's 5250 emulation modes and into a true graphical environment. It will also include voice annotation, limited character recognition and will generally tighten integration.

ON SITE

Massachusetts Financial Services
Boston

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Operating systems

DOS 6.0 adds utility features

By Michael Fitzgerald

Microsoft Corp.'s 6.0 version of DOS plugs holes in the operating system that utility vendors used to fill but leaves plenty of room for new features.

Many of MS-DOS 6.0's features were licensed from established utility vendors. For instance, DOS 6.0 uses a subset of Symantec Corp.'s Norton Backup, the Norton disk defragmenter and Central Point Software, Inc.'s antivirus software. Microsoft also modified disk compression software licensed from Vertisoft Systems, Inc.

At least one user said he still sees a need for utility products.

"I can see home users using the [DOS] utilities set, but corporate users will need a full-featured utility," said Philip Ketchum, network administrator at Baxter Healthcare Corp.'s cardiovascular group in Irvine, Calif. Ketchum said MS-DOS 6.0.'s backup utility does not support tape backup, for instance.

Utility vendors have anticipated the release of MS-DOS 6.0 by building more features into their own products.

Central Point released Safe Six, an update for the 300 viruses that have been discovered since the antivirus component in MS-DOS 6.0 was completed. Central Point also released PC Tools 8.0, which has been optimized to run on MS-DOS 6.0.

Symantec released Norton Utilities 7.0, with special support for MS-DOS 6.0.

Quarterdeck Systems, Inc. will release QEMM Version 7.0 "within 45 to 60 days of MS-DOS 6.0's actual ship date," a spokesman said.

Tomorrow, Stac Electronics is scheduled to release Stacker 3.1 for Windows and DOS. The compression utility maker, embroiled in a suit with Microsoft over the inclusion of compression features in MS-DOS 6.0, claims Stacker 3.1 is capable of being fully integrated into MS-DOS 6.0 through the same hooks used by DoubleSpace.

While some utility vendors have bemoaned MS-DOS 6.0's release, such vendors "know they need to change their products on a regular basis or go out of business," said Amy Wohl, head of Wohl Associates in Bala Cynwyd, Pa.

MS-DOS upgraded

CONTINUED FROM PAGE 39

about 1.7 to 1; your mileage may vary). And the multiple configuration support is nice (I've always used batch files to accomplish the same thing), but not something the average user is going to need.

As for the other utilities, they tend to be stripped-down versions of releases from other vendors. Backup is Symantec Corp.'s Norton Backup minus tape drive support and scheduling capabilities, so anyone serious about backups who does not want to sit at the machine and swap floppies will need to get a more complete package.

The virus protection package comes from Central Point Software, Inc., and you must join a subscription service to keep it up to date. And MemMaker does not support multiple configurations completely: You have to create your configurations, optimize them separately and then combine them into a single file, a process that may stymie less-than-power users.

And none of the features of MS-DOS 6.0 are compelling for a firm that does not have disk space problems and is already using other, more full-featured utilities on its systems. Microsoft will have a harder sell into corporations with this version than it did with MS-DOS 5.0.

So if your current DOS setup ain't broke, MS-DOS 6.0 won't fix it.

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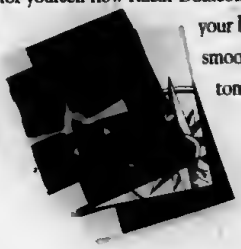

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Casper no friend of computers in April

By James Daly

Forking a check over to the Internal Revenue Service isn't the only thing you have to worry about this month. A plethora of viruses provides another taxing situation for information systems security managers.

Although most viruses triggered in April are nondestructive nuisance viruses, several are quite devilish. The Christmas Tree and Casper viruses activate in early April. A virus program that uses an integrity checking approach should be able to detect and then eradicate both of them.

WATCH

A particularly nasty virus, however, arrives on April 15, when Casino rears its ugly head. Casino is a memory-resident infector of .COM files, including COMMAND.COM. Upon activation, the virus challenges the user to a slot machine game with the following message: "DISK DESTROYER. A SOUVENIR OF MALTA. I have just DESTROYED the FAT on your Disk!! However, I have a copy in RAM and I'm giving you a last chance to restore your precious data. WARNING: IF YOU RESET NOW, ALL YOUR DATA WILL BE LOST FOREVER! Your data depends on a game of JACKPOT. CASINO DE MALTE JACKPOT." If your system loses the game, Casino will trash the file-allocation table.

The virus activation dates are for general awareness and are not exclusive. And remember to back up those floppies.

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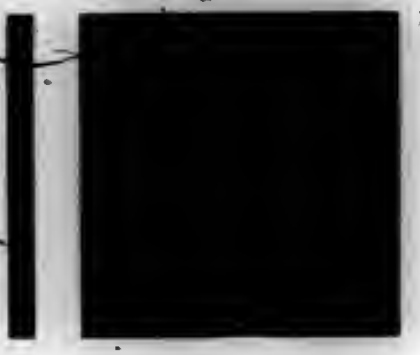

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Verbex delivers continuous speech interface for Windows

By Michael Vizard
EDISON, N.J.

Verbex Voice Systems, Inc. has taken a big step toward making voice recognition systems more practical and affordable by delivering an interface for Microsoft Corp.'s Windows that supports continuous speech.

The Verbex offering, with an introductory price of $695, consists of Listen for Windows software and a digital signal processing (DSP) board that converts human speech into keystrokes that a Windows application can understand.

"Voice recognition applications require lots of floating-point calculations that are provided by Fast RAM in DSP boards. The price of Fast RAM has come down to the point where we can now offer a Windows product on PCs," said Verbex President Larry Dooling.

The Verbex offering is capable of recognizing up to 300 words out of a palette of 420 words supplied by Verbex.

In addition to the typical office automation applications usually associated with voice recognition, the Verbex offering is also finding a place on the factory floor.

Circuitest, Inc. in Nashua, N.H., is using the product to free the hands of printed circuit board testers, who typically must use both of their hands to inspect boards using a pair of electronic probes.

The Verbex software allows them to display and manipulate a schematic of the board while they test it.

"It makes an incredible difference. The testers are about 30% more productive," said Mike Gowing, a software engineer at Circuitest.

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There's quite a battle raging between Word and WordPerfect.

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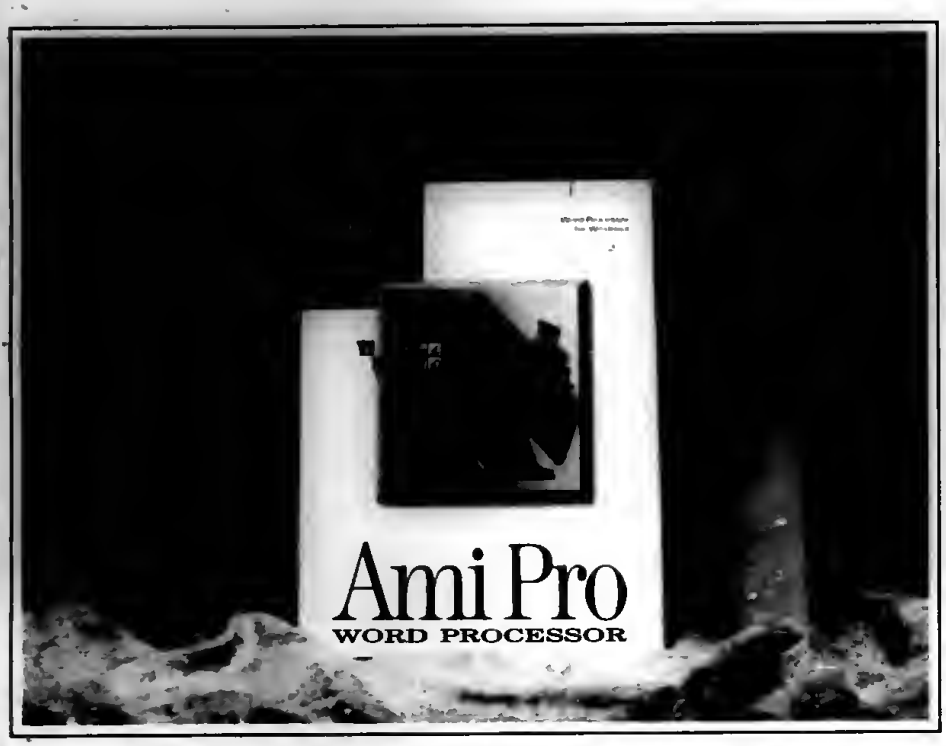

In the War of the Words, there's one clear winner. Ami Pro.

Word vs. WordPerfect.* It's billed as the battle of the world's two greatest word processors. Hardly. According to most independent judges, Lotus® Ami Pro® 3.0 is the clear and convincing leader of the word processing pack. Word and WordPerfect are following its lead, scrapping it out for second and third.

Check the rankings.

Ami Pro 3.0 is ranked the #1 Advanced Word Processor for Windows™ by the National Software Testing Laboratories. (9/92)†

Recently, in an InfoWorld review, Ami Pro received the highest score ever given for a Windows word processor. (9/28/92)

Lotus Ami Pro captured the 1992 PC Computing MVP Award. (12/92) (Note: The MVP award also appears in the new WordPerfect ad. That's last year's award.)

PC Magazine recently named Ami Pro one of the Best Products of 1992. They said, "No other product can match...the sheer pleasure of using it." Microsoft Word received an Honorable Mention, with the comment "...it's a step behind Ami Pro." (1/93)

Now, perhaps the battle royale between Word and WordPerfect has been put into perspective.

And you probably wonder what it is that makes Ami Pro clearly better?

†Among all word processors tested Software Digest, Ratings Report, Vol 9 #6 Sept. 1992. Reprints available upon request.*On weekdays, plus 7AM to 4PM on Saturdays **Offer expires 9/30/93 Call for

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nd place.

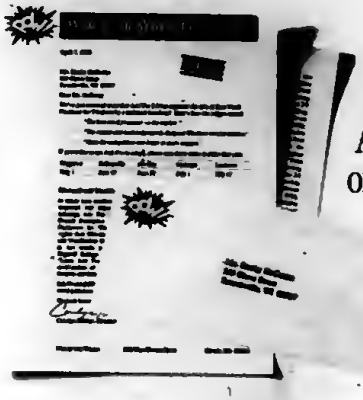
The battle of the features.

Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It does so many things with so little effort, most people never even bother to open the manual.

To name a few, there's real, honest, no ifs-ands-or-buts WYSIWYG. There's Fast Format, for quick repetition of text formats. There are customizable, editable SmartIcons.™ Not to mention SmartClick, where the right mouse button will automatically shift you to the appropriate dialogue box to change fonts, styles or frame formats, based on what you're doing.

There's automatic renumbering of lists. Preview of Style Sheets. QuickStart on-line tutorial. Free 24 hour a day technical support.* And to ease your mind, a 60-day money back guarantee of your complete satisfaction.

And, if you're switching from WordPerfect for DOS, relax. Ami Pro makes it easy with a number of special features. Like seamless conversion of WordPerfect files. And a SwitchKit so that when you type in WordPerfect commands, Ami Pro shows you how to perform the same functions using pull-down menus or one-click SmartIcons.



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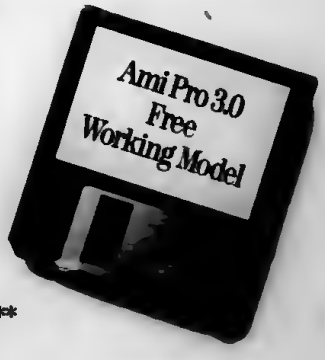

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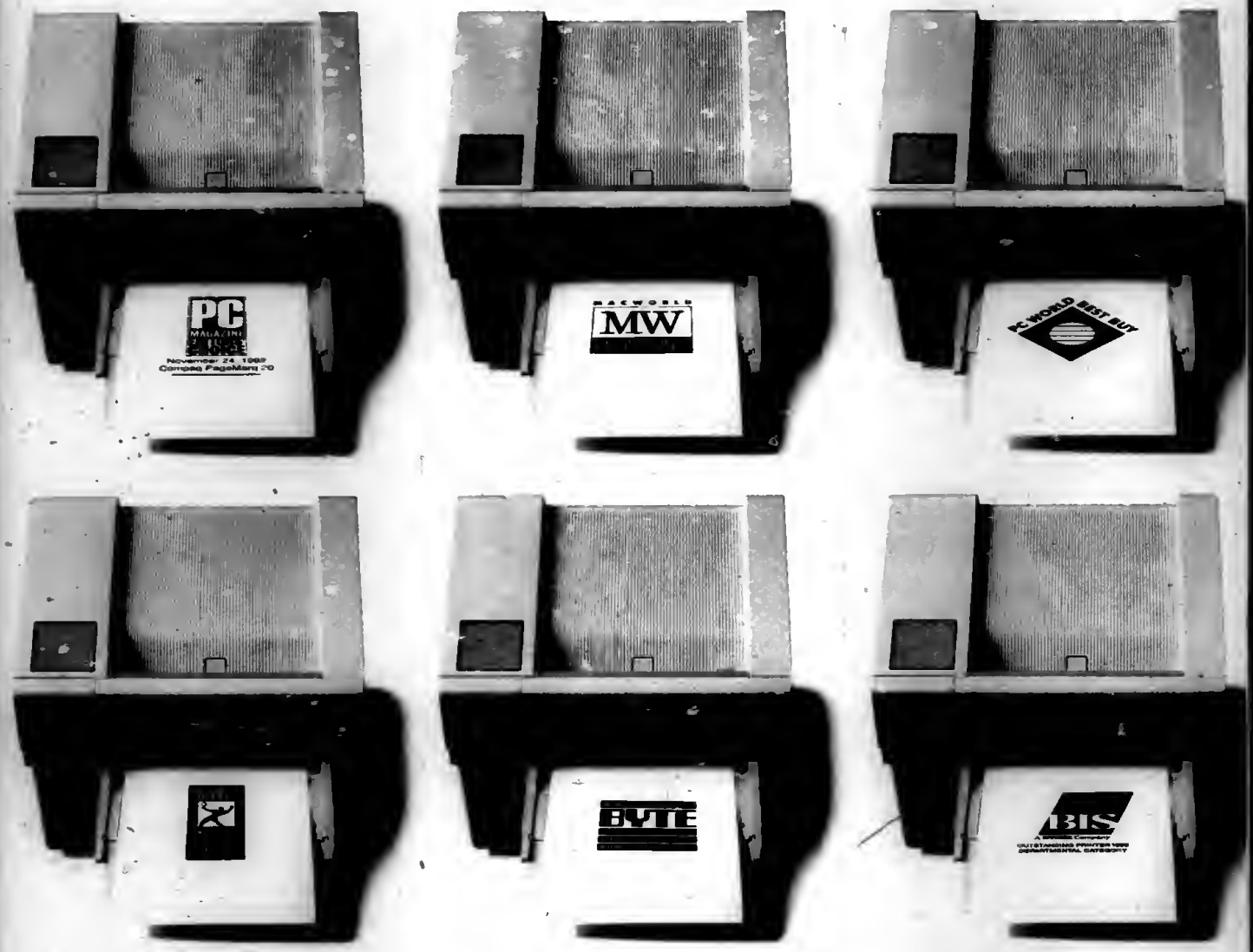

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AppleShare lineup will reach larger workgroups

By James Daly
CUPERTINO, CALIF

Apple Computer, Inc. has announced two new versions of its AppleShare software that are tailored to meet the more demanding print and file service needs of users in larger workgroups.

Both AppleShare 4.0 and the high-end AppleShare Pro were announced along with Apple's Workgroup Servers at the CeBIT computer show in Hannover, Germany, recently.

Morris Taradalsky, general manager of the Enterprise Systems Division, said the newcomers were designed for "Macintosh-mostly networks" but will support DOS and Microsoft Corp. Windows clients.

Poised for client/server

The beefing up of AppleShare represents another move on Apple's part to take advantage of increased user enthusiasm for designing client/server architectures.

Taradalsky said Apple hopes to sell the Macintosh as an easy-to-use way of designing client/server systems and thus increase Apple's presence in information systems shops across corporate America.

According to a study by the Business Research Group, a Boston computer consultancy, AppleShare servers were less expensive to manage during a one-year period than comparable file and print servers on other platforms. The study concluded that ease of use could be translated to lower life cycle costs.

Workgroup-ready

AppleShare 4.0 was designed for small to medium-size workgroups and supports 150 concurrent user log-ons. The $1,899 package was specifically designed for machines running Motorola, Inc.'s 68040 microprocessor, company officials said.

Version 4.0 will come preinstalled on the new Workgroup Server 60 and 80 and will also run on the Centris 610 and Quadra 700, 800 and 950. The package is scheduled to ship this summer.

AppleShare Pro, which was designed for demanding file service environments, will run on the new Workgroup Server 95. The $2,399 package will support up to 200 concurrent user log-ons moving large data files around the network. It is expected to ship later this month.

The company will also continue to offer the $1,199 AppleShare 3.0 as an entry-level way to build a centralized file/print server. AppleShare 3.0 can turn any Macintosh into a network server, Apple officials said, and can support up to 120 concurrent user log-ons.

Mac client efforts grow

Novell, Microsoft, Banyan offer connectivity solutions

By Michele Dostert

■On the corporate desktops of America, Apple Computer, Inc. Macintosh computers have suffered from a perceived snobbishness. While they connected to one another easily, they were often unwilling, limited participants in PC-based local-area networks.

"People have avoided Macs because they just don't want the hassle of connecting them to the same LAN, E-mail and file-and-print sharing used by PC desktops," said Patrick Carney, information systems director at Asea, Brown, Boveri in North Brunswick, N.J.

In the past six months, however, leading LAN operating system vendors, including Novell, Inc., Microsoft Corp. and Banyan Systems, Inc., have all announced plans for improved Macintosh support that should lower resistance to Macintoshes among corporate IS groups.

Virtually a Macintosh

Novell, the LAN market leader, has detailed a three-stage plan for improving the lot of Macintoshes on NetWare LANs. Currently, Novell's NetWare v3.11 operating system supports Macintoshes through a server-based NetWare Loadable Module, called NetWare for Macintosh, that loads the AppleTalk protocol stack and the Apple File Program (AFP) into the PC server, turning part of the server into a "virtual Macintosh."

NetWare for Macintosh users have no NetWare shell on their Macintoshes and no log-in script in the NetWare server, and they can only address the "Mac-aware" part of the server on a peer-to-peer basis. NetWare for Macintosh for NetWare 4.0 is scheduled to ship by June.

According to Steve Nelson, vice president of Novell's NetWare clients group, the company plans to beef up Macintosh support considerably in the next year. Novell is beta-testing a product called MacIPX, a version of Novell's IPX/SPX protocol stack that will allow Macintosh users to access the NetWare server or other DOS machines without first loading an AppleTalk stack into the PC.

However, Nelson emphasized that MacIPX will provide only transport-layer services, not full client support for Macintoshes on NetWare.

By the end of 1993, Novell plans to roll out a third-party development product called NetWare Server Support for Macintosh, an application programming interface (API) aimed at third-party developers that will allow them to use NetWare Core Protocols and other NetWare services, such as directory and messaging, when developing distributed applications for the Macintosh.

In around a year," Nelson said, Novell will roll out a product called NetWare Workstation for Macintosh, new client software that will bring the Macintosh into full citizenship on NetWare LANs. "We're going to teach the Mac to speak NetWare, just like DOS, Windows and OS/2 clients do now," Nelson said. He noted that Macintoshes running NetWare Workstation for Macintosh will appear like any PC-based NetWare client to LAN managers and can be managed as such.

Microsoft currently supports the Macintosh in its LAN Manager products the same way Novell does in NetWare — by loading AppleTalk and the AFP into the LAN Manager server.

The Advanced Server, Microsoft's upcoming Windows NT-based version of LAN Manager,

Mac client, *page 48*

IBM adds scheduling software too quietly

By Lynda Radosevich
WHITE PLAINS, N.Y.

With fanfare so lacking that users and analysts marveled at its absence, IBM began shipping last month a local-area network scheduling software package as part of its LAN Office strategy.

Called Time and Place/2, it supports electronic coordination and scheduling of meetings and resources using IBM OS/2-based servers and OS/2- or Microsoft Corp. Windows-based clients. A connection to IBM's host-based OfficeVision calendars is being tested at beta-test sites, but IBM said it does not have a ship date scheduled yet.

"They haven't played it up as much as they should have," said Tom Cox, director of information support at the Carolina Electric Cooperatives, an association of electric companies in North Carolina. "IBM needs to get off its corporate hind end and blow its own horn."

The lack of notice, said David Ferris, editor of the electronic-mail industry newsletter "Ferris E-Mail Analyzer," pointed to IBM's diminished influence in the office automation field.

> The lack of notice pointed to IBM's diminished influence in the office automation field

The Carolina Electric Cooperatives beta-tested Time and Place/2 while looking for a scheduling package for 140 end users, most of whom have OS/2-based PCs. Cox said he plans to purchase the software for all 140 people to schedule meetings and the use of resources such as notebook computers and cars.

Consequently, the association plans to better allocate the work of its support staff.

"We took a poll of our secretaries and found that they spent up to two weeks per month just scheduling people," Cox said. "Now any person in the corporation can just click on an icon [in the OS/2 WorkPlace shell] and see who's busy or not busy and schedule a meeting."

Before making the final purchase decision, Cox will look at Lotus Development Corp.'s Organizer. The organization already uses Lotus' Ami Pro word processor and CC:Mail E-mail, and Cox said he wants to see whether the Organizer integrates better with those packages than Time and Place/2.

However, because the IBM scheduler supports Lotus' Vendor Independent Messaging (VIM) interface, IBM said it will send mail meeting notices to all VIM-enabled mail systems such as CC:Mail.

Time and Place/2 includes a group time manager, an individual to-do list and memos. It will operate over IBM OS/2 LAN Server or Novell, Inc. NetWare LANs. It is priced at $595 for the server software and $55 per client.

The particulars

The server for Time and Place/2 is an OS/2 2.0 32-bit application that uses the IBM Extended Services Database Manager. It will support Database 2 OS/2 when it is available. It is one of the first OS/2 2.0-based client/server applications from IBM Programming Systems.

Unix-based server scalable to five processors

By Kim S. Nash

Wyse Technology, Inc. recently unveiled a new Unix-based symmetric multiprocessor designed to support up to 250 active users.

The Series 7000i Model 760MP server will also support Microsoft Corp.'s Windows NT, the San Jose, Calif., company said.

With a base price of slightly less than $20,000 for a one-CPU system, the Model 760MP server is scalable to five Intel Corp. 66-MHz I486DX2 processors and will accommodate Intel's Pentium chip after mid-May, when Intel formally unveils Pentium, according to Dave Everett, senior vice president of marketing at Wyse.

The other server companies that are expected to ship Pentium machines next month include Compaq Computer Corp., NCR Corp. and NetFrame Systems, Inc.

While Pentium remains elusive, users can expand Wyse servers with additional I486DX2 boards for $7,499 apiece. A maxxed-out 760MP — a five-CPU configuration — would cost approximately $50,000.

Wyse has worked with Microsoft to build a hardware abstraction layer (HAL) to let Wyse technology act as an interface between the operating system microkernel and hardware device drivers. Wyse's HAL was included in Microsoft's preliminary developer's release of Windows NT.

Attendees at Comdex/Fall '92 in November saw a demonstration of the 760MP, which is now shipping. The machine runs a special symmetric version of Unix System Laboratories, Inc.'s Unix System V Release 4.

Hewlett-Packard Co. will provide on-site support for the new boxes, Wyse said.

Mac client effort

CONTINUED FROM PAGE 47

will feature drastically improved Macintosh support, according to Tom McCann, Microsoft's product manager for Advanced Server. New services will include support for 255 Macintosh clients, improved manageability of Macintosh clients in NT's File Manager and new NT-based security for Macintosh clients that will map file access across Macintosh, DOS, Windows, OS/2 and NT platforms.

"One of the neatest things we're adding is letting Macs print seamlessly to non-PostScript printers. If Mac users send a file to one, we will map it over for them on the fly," McCann said. He also promised that Macintosh support for LAN-based Microsoft Mail, SQL Server and SNA Gateway will be released by the end of the year.

Macs on Vines

Banyan also beefed up Macintosh support in its newly released Vines 5.5 LAN operating system. According to Pam Campagna, product line manager for Vines, Banyan also supports the Macintosh by loading AppleTalk and AFP on top of the Vines kernel. However, Banyan has created a "file translation" algorithm, mapping Macintosh 32-character file names to DOS 8-character syntax and vice versa, so all Vines-stored files can be seen on any client, regardless of where they were created.

Banyan also built a "security translator" that maps both Macintosh and PC file access rights into the Vines security system so that users will have consistent access, depending on specifically granted rights, across all platforms.

Since AppleTalk can be tunneled through Vines servers, Macintosh in remote sites can use AppleTalk to connect together locally and use the T1 or integrated Services Digital Network support in Vines servers to access wide-area network-based mail, file and print services, Campagna said. She added that Macintosh APIs will be included in the forthcoming Vines 5.5 tool kit, a set of third-party development tools for Vines 5.5.

Sharpen your edge.

IBM imaging systems can

While some people view imaging systems as just document storing tools, others view them as something much more powerful.

Strategic tools.

Take the Auto Club of Southern California. With 140 people filing 34,000 documents a day in 21 *miles* of folders, paper gridlock resulted.

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We suggested ImagePlus,® IBM's imaging offering for work process management. In short, they projected savings of $2 million per year by

Reach ships WorkMAN work-flow software

By Lynda Radosevich
SUNNYVALE, CALIF

Observers say users can expect quick paybacks from new local-area network-based work-flow technology such as the new WorkMAN work-flow management package from Reach Software Corp.

"The attraction of work-flow systems is that the payback is astonishing; it's routine to see a 100% return on investment in two months," said John Donovan, director of groupware services at WorkGroup Technologies, Inc., a consultancy in Hampton, N.H.

In general, work-flow systems automatically route and track forms and data through an organization in a logical manner. The payback comes in increased efficiency resulting in less personnel and faster product development cycles.

"The other attraction is that you can install work-flow systems one workgroup at a time rather than starting at an enterprise level," Donovan said.

To reach that market, Reach Software has begun shipping WorkMAN.

The software is aimed at businesses that want to develop work-flow applications that work with their Banyan Systems, Inc. Vines and Novell, Inc. NetWare Global Messaging and Message Handling Service-based electronic-mail systems.

The Reach package is composed of a desktop Microsoft Corp. Windows application that displays task lists, projects and messages; a forms router that can track forms and attached files; management software that transparently controls how tasks are processed and tracks the work done; graphical programming tools for building applications; and scripting language for launching and debugging the work-flow applications.

EMC Corp., a disk storage device maker in Hopkinton, Mass., is testing work-flow applications built with WorkMAN to increase the efficiency of its manufacturing process.

Peter Markell, MIS director at EMC, said work-flow applications would add value to his Vines network. He said he is looking at several packages, including Lotus Development Corp.'s Notes with an Action Technologies work-flow add-on. However, he said he likes WorkMAN because it can use the Banyan Vines StreetTalk addressing directory.

Now, most work-flow systems are deployed enterprisewide and send images rather than editable documents, analysts said. However, they said they expect E-mail-enabled work-flow applications to gain popularity.

The full WorkMAN package starts at $4,995.

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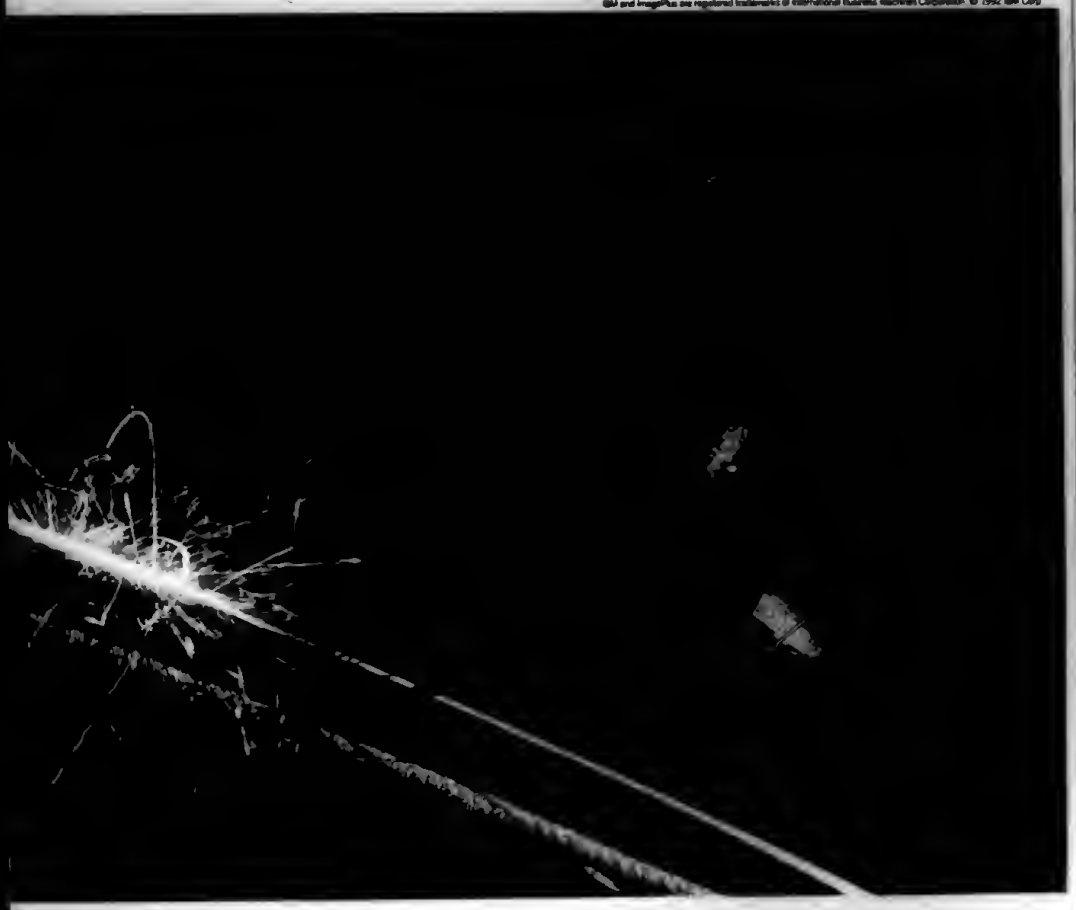

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In Brief

4GL integration

Information Builders, Inc. announced the integration of its Focus 4GL fourth-generation language product with the Tuxedo System/T transaction monitor from Unix System Laboratories, Inc. It combines a popular 4GL with an open systems transaction monitor. Focus for Tuxedo will work with the System/T monitor and the Focus read/write interface to relational database management systems such as those from Oracle Corp. and Sybase, Inc.

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Tune in the prisoner

By Joanie M. Wexler

■ Videoconferencing has begun to make its mark in a somewhat controversial sector of society: the courts.

Several state judicial systems are using the technology to replace short sessions during which a judge might quickly reduce an inmate's bail or grant a trial continuance. The main goal is to dramatically reduce the number of inmates transported from jails to courthouses. The reason: Physically moving them means big costs in labor, vehicles and fuel consumption in an economic climate that can ill afford it.

And despite some squeamishness about the constitutionality of videoconferences replacing live courtroom appearances, the cost-cutting, logistical and security benefits of the technology have prevailed in 17 U.S. counties for routine court business.

Some counties have gone as far as to use videoconferencing for arraignments, an accused's first court appearance after arrest during which the judge sets bail and a court date. This application has spurred much of the controversy over an individual's legal right to physically stand before a judge. In fact, some public defenders appointed by the state to represent those who cannot afford to hire their own attorney blanketly object to the courtroom videoconference if the defendant has not waived his right to a live appearance.

For example, John Darrell, a trial attorney for the Committee for Public Counsel Services in Plymouth County, Mass., views electronic sessions as discriminating against an individual based on financial status.

"If you can afford bail, you have the opportunity to go to court," he said. "The videoconferencing alternative means a person who doesn't have the money to make bail is prevented from going. When money [is the determining factor], I see that as a violation of due process."

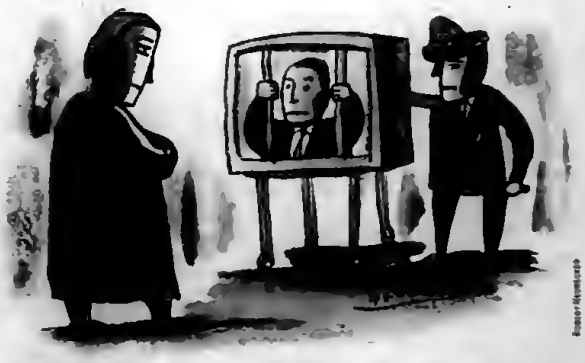
Camera-shy

In addition, Darrell said, the impression an inmate makes via video could make him look "guiltier." Each time one of his clients has been on video, he said, the individual has appeared "confused and uncertain," as he is usually not technology-savvy, he said.

Darrell intends to soon file a motion against videoconferences with the Massachusetts Supreme Judicial Court to halt what is currently a 90-day test under way in Massachusetts' Plymouth County for transporting inmates from the Plymouth County House of Correction to Brockton District Court — a 45-minute drive. A Massachusetts law requires incarcerated individuals to see the judge every 10 days.

However, these frequent visits, which often last a matter of minutes, entail strip-searching inmates at the beginning and conclusion of the trip, transporting them from jail to courthouse accompanied by a sworn deputy and confining them to a supervised holding room for three to six hours before taking them before the judge, explained Roy Lyons, a Plymouth County

Virtual court, *page 54*



Holy bus fare, Batman!
More than 26,000 defendants were transported more than a quarter of a million miles during 1992 from the Plymouth County House of Correction to various locations throughout Massachusetts.

Network management

Novell NMS to manage IP

By Joanie M. Wexler
SANTA CLARA, CALIF.

Novell, Inc. made strides last month in its ongoing efforts to accommodate all facets of enterprise networks when it announced that business partner SynOptics Communications, Inc. has ported its Unix-based Optivity network management application to Novell's NetWare Management System (NMS) platform.

> To date, SynOptics has no plans to incorporate management of Novell IPX devices into its SunNet Manager version of Optivity.

The new version will be available this month for $3,495.

The move is significant for users pressuring Novell to deal with network components beyond its NetWare operating system — such as bridges, hubs and routers — which Optivity manages, said Kevin O'Neill, vice president of research at Business Research Group in Newton, Mass. "Novell can no longer say 'anything other than the network operating system is not our problem' because they've built end-to-end network expectations," he said.

However, today, there is a "patchwork quilt" of hardware and software products for managing enterprise networks containing NetWare, "which creates confusion to users. They're not confident they've struck upon a cohesive end-to-end scheme" for managing their increasingly critical networks, O'Neill said. This is a situation that the Optivity announcement should address, he said.

SynOptics has also become the first third-party vendor to resell NMS, which is Novell's answer in the DOS/Microsoft Corp. Windows world to successful Unix- and Simple Network Management Protocol (SNMP)-based management platforms such as Hewlett-Packard Co.'s OpenView and Sun Microsystems, Inc.'s SunNet Manager.

Novell and SynOptics cited overlap in their customer bases as an impetus for the alliances.

"At least well over half of SynOptics accounts are NetWare shops," estimated Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif.

Optivity for NetWare and SynOptics hubs will support SNMP for both Internet Protocol (IP)- and Novell IPX-based networks so that users with mixed IP/IPX shops can manage both environments together. Today, it would not be uncommon for users running mixed IP/IPX networks to have two separate management domains.

This is because NMS' core capability, called NetWare Management Map (NMM), automatically discovers individual IPX devices and the existence of IP networks but cannot manage individual IP devices, Howard said. Optivity for NetWare will allow network administrators to put IP devices on NMM, and "anything on the map, Optivity will manage," Howard added.

However, "this isn't slick," Howard said, because administrators have to manually enter IP devices onto the map rather than the system automatically discovering them, as it does with IPX resources. The degree to which this is a headache depends on how large a user's IP population is.

Schwab taps Sun for client/server

By Elisabeth Horwitt
SAN FRANCISCO

Charles Schwab & Co. is one firm that cheered when Sun Microsystems, Inc. announced its commitment to the Common Operating System Environment (COSE).

COSE is a recent initiative by six Unix vendors to produce a common "look and feel" across their platforms and to adhere to common application programming interfaces (API) by mid-1994. The vendors' main goal with the joint effort is to ease user frustration with the many flavors of Unix that are causing compatibility problems today [CW, March 22].

Schwab's Sheri Anderson: *Schwab will use the 'Sun classic'*

Schwab recently tapped Sun to provide workstations for a client/server architecture that the investment firm is in the process of implementing [CW, April 20, 1992]. Although no contract has been signed yet, Schwab plans to use "the Sun classic running Solaris Version 2.2" in local-area network configurations, said Sheri Anderson, Schwab's senior vice president of technology.

By joining COSE, Sun is committing to support the Open Software Foundation's Distributed Computing Environment (DCE), which is the "software glue" that is being used to tie the various client/server systems together, she said.

Prior to the COSE announcement, Schwab was counting on buying DCE software for its Sun systems from Transarc

Schwab, *page 54*

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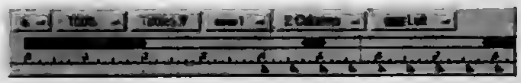

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Schwab taps Sun

CONTINUED FROM PAGE 51

Corp., Anderson said. Now, however, the brokerage house will be able to both purchase DCE software and get support directly from Sun.

A major criterion for the brokerage firm's selection was the workstation's ability to access stock data from services such as Quotron Systems, Inc. and ADP Network Services, Anderson said. Many of the major services deliver information to proprietary Sun SPARCstations now; Schwab will be working with them to support the investment firm's APIs, she said.

Schwab also welcomed the emergence of the COSE user desktop environment, a common graphical user interface (GUI) that will run across various COSE members' systems.

"It fits right into our strategy," Anderson said. Her staff has been working on a GUI-based desktop environment that would have a common look and feel, while providing "sockets" for in-house-developed and packaged applications.

In addition, Schwab programmers are using the GUI to develop "workbenches," or desktop environments tailored to a given type of user, Anderson said. "A trader would do a lot of transaction processing, while an analyst would do a lot of personal computing along with accessing a large amount of mainframe and server data."

Schwab will "absolutely adopt the COSE desktop environment, which is right along the lines of what we were doing," Anderson said.

Schwab is in the process of off-loading "a set of our mainframe applications" based on Information Builders, Inc.'s Focus to Hewlett-Packard Co. midrange systems running Unix, Anderson said.

The firm has yet to pick a vendor for the "middle tier" of its client/server architecture: the application and data servers. HP, IBM and Sun are all strong contenders, Anderson added.

The virtual court

CONTINUED FROM PAGE 51

Sheriff's Department spokesman.

He added that inmates leaving the jail "presents all kinds of opportunities for mischief."

Sheriff Peter Flynn said Plymouth County last year transported 2,800 inmates from the jail to the court, "and we really feel that 60% to 70% of those trips would be unnecessary using video communications."

While the county has not yet translated expected savings into dollars, "in talking to other jurisdictions around the country doing video, we know they have paid for the equipment in one to two years. After that, it's pure savings," Flynn said.

Implemented in Alameda

Among the 17 districts where the technology's constitutionality has been upheld is California's County of Alameda, where some inmates can conduct interviews with their attorneys from a video room in their housing units "so they don't even need to be accompanied by a sworn deputy," explained Don Naples, chief of communications for the county.

Alameda County conducted about 8,400 courtroom video sessions in 1992 alone "primarily to handle the logistics problem" of transporting inmates 30 miles from the Santa Rita County Jail to the public defender's office for attorney meetings, Naples said. All inmates "had to get on the same bus no matter where they were going," so getting the accused around to public defenders' offices, courts and other jails became a logistical nightmare that ate up time and money, he explained.

The district has invested more than $1 million in PictureTel Corp. videoconferencing equipment — the same gear that many of the other districts, including Plymouth County, are using. Alameda is using the technology for arraignments and attorney/client interviews.

Plymouth County in Massachusetts "has not yet been granted penny one" from the county, state or federal government of the $90,000 it will take to outfit the Plymouth jail and Brockton District Court with PictureTel video gear. Sheriff Flynn, however, has received videoconferencing funds for a new 1,140-bed jail.

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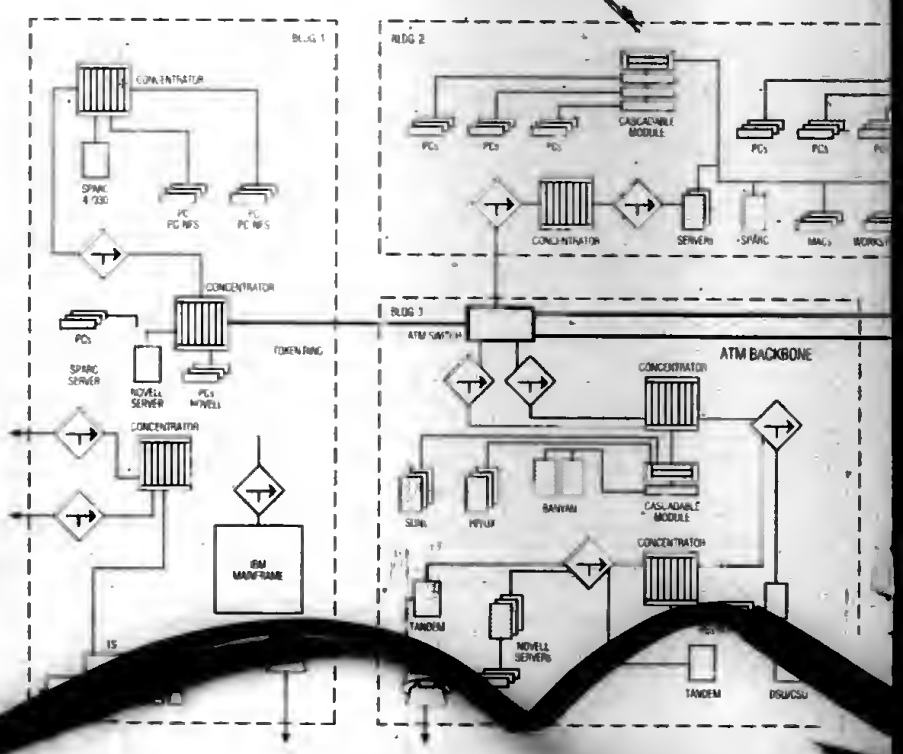

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Novell traveling in new circles

By Michele Dostert
SALT LAKE CITY

More than 3,000 NetWare developers crowded Novell, Inc.'s recent Brainshare conference, with many asking the kinds of questions they might have posed to IBM or Digital Equipment Corp. a few years ago.

Attendees filled sessions on upcoming NetWare application development services such as global messaging, imaging, telephony and multimedia.

"We'll be incorporating some of these technologies, such as imaging and telephony, into our products — not right away, but we came to start looking at them," said Robert Moldoff, operations manager at Applied Business Technologies, Inc., a Newton Square, Pa., developer of NetWare-based applications for the education market.

Bob Young, Novell's product marketing manager for NetWare, said the company will publish application programming interfaces and ship software development kits for global messaging and imaging within the next two months. Telephony kits are due within six months and multimedia within a year.

Popular sessions

Attendees also packed sessions on Novell's new NetWare 4.0 product, listing storage and directory services, upgrading techniques and performance tuning as their overriding concerns. Sessions on LAN-to-host application development and wide-area network how-tos were also well attended.

"We have 11 servers in three states, so the wide-area stuff is critical," said John Galvin, a software engineer at Swiss Colony, Inc., a mail-order house based in Monroe, Wis. "But we're working on building PC applications that can access our mainframe data, so the NetWare for SAA sessions were most important to us."

Filling NEEDS

At its recent conference, Novell moved to enhance NetWare's appeal to corporate programmers with a pilot support program.

Novell Enterprise Developer Services (NEEDS) subscribers will receive the same services offered by Novell's Professional Developer's Program, including early access to development tools, unlimited priority support and 10 free Software Developer's Kits.

NEEDS customers can also purchase additional Novell services, including a system assessment by Novell Consulting Services.

After the assessment, Novell will make recommendations to facilitate in-house application development or contacts with Novell's custom development partners such as Electronic Data Systems Corp. and Business Systems Group.

"In shops like ours, where we have 300 [NetWare engineers] doing customized application development, we absolutely have to have this high level of support," said Stanley Jarocki, a vice president at Citibank NA's business systems unit.

Corporations that have a master license agreement with Novell can enroll in NEEDS at no extra charge. Others have to pay $25,000 for one year.

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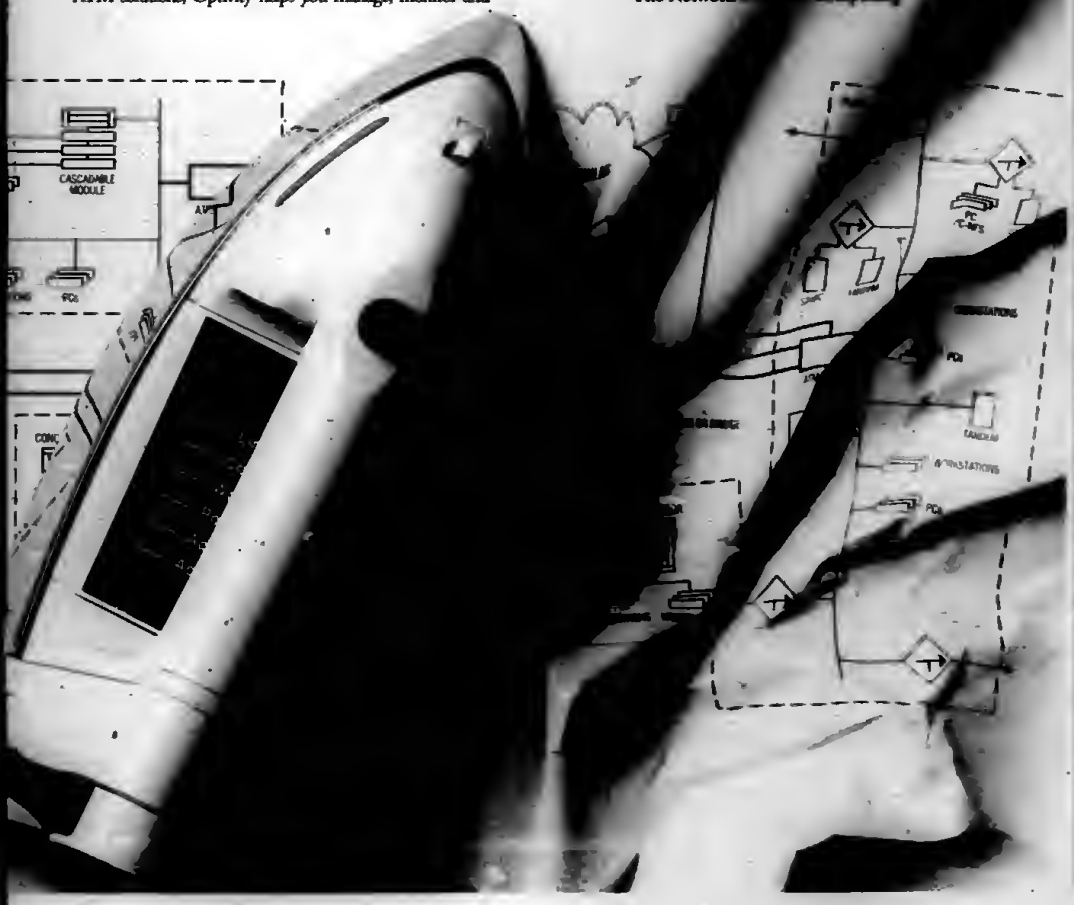

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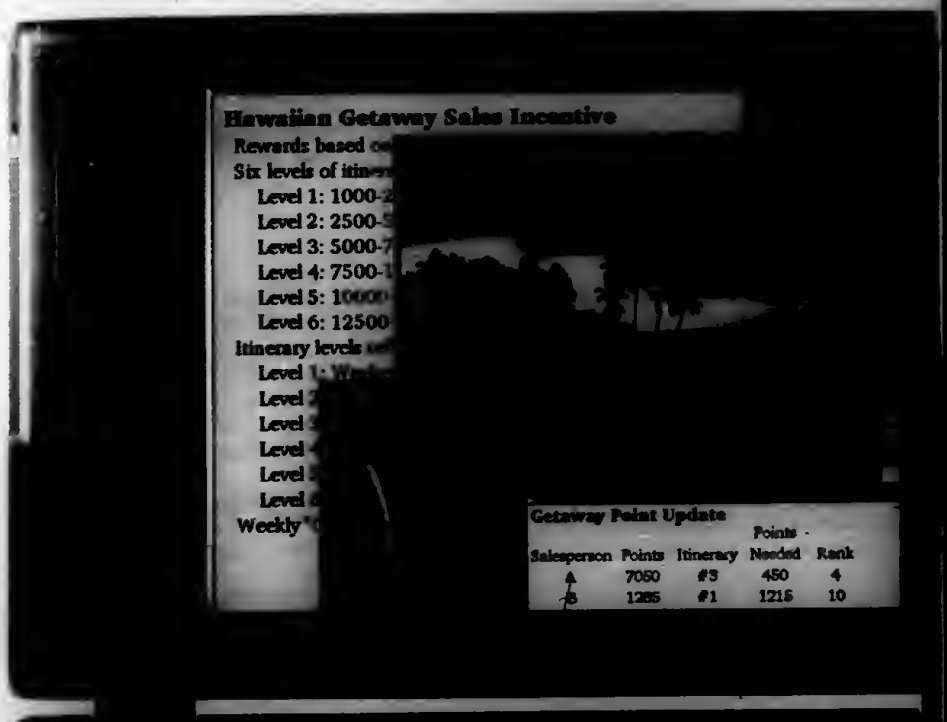

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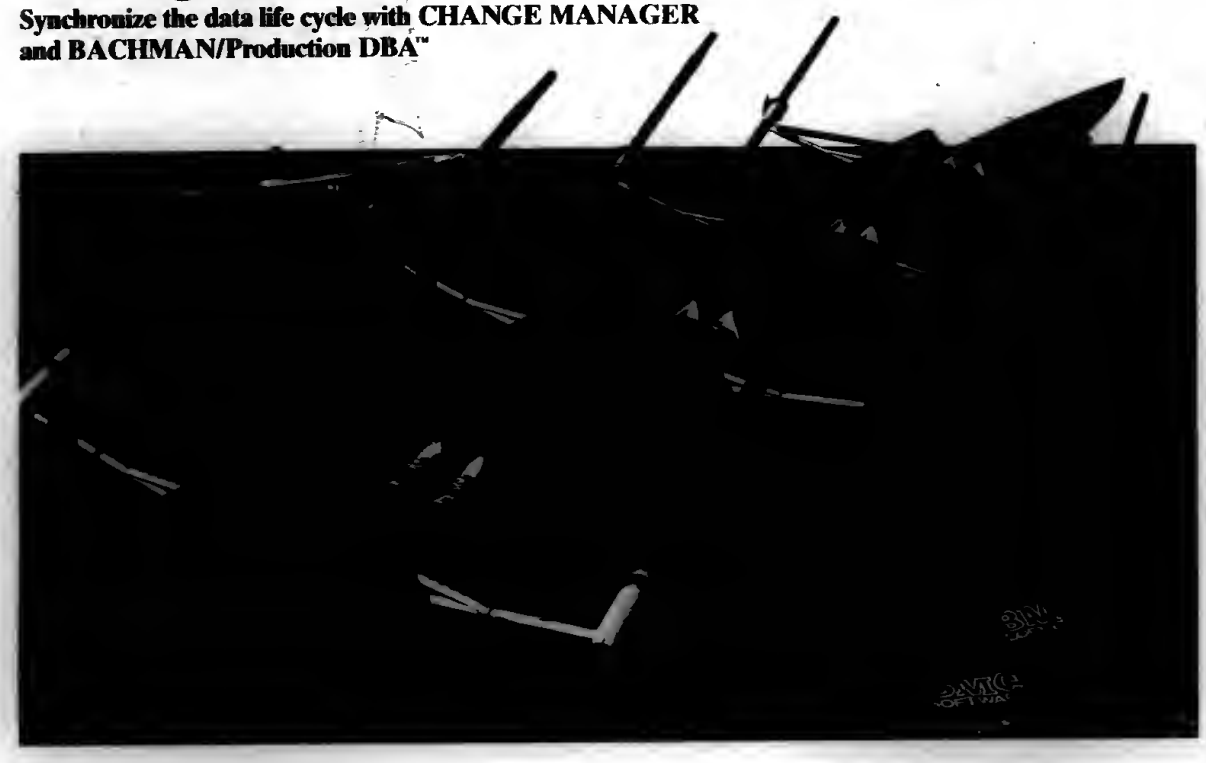

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IBM Business Partner

SEC electronic filing system in high gear

By Gary H. Anthes
WASHINGTON, D.C.

After nearly a decade of pilot tests and volunteer filings, the first 500 of some 15,000 companies this month are beginning mandatory electronic filing of financial data with the U.S. Securities and Exchange Commission (SEC).

The Electronic Data Gathering, Analysis and Retrieval system, or Edgar, is intended to replace with electronic the mountain of paper the SEC receives from corporations that offer securities to the public. It now takes in about nine documents — averaging 40 pages each — per hour, and that is expected to grow to one document per minute by year's end.

Monthly growth

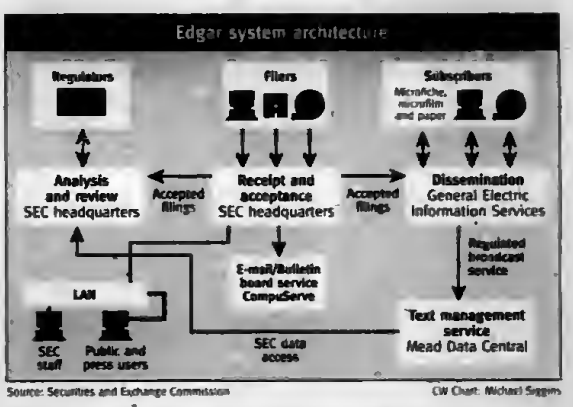
The implementation schedule for Edgar calls for growth throughout the year in the number of companies subject to mandatory filing through the system. The cumulative number of firms is:
April: 500;
July: 1,700;
October: 2,500;
December: 3,500.

By 1996, the SEC will process some 10 million pages annually through Edgar, according to John J. Lane, the SEC's chief information officer.

At the heart of Edgar are a pair of high-end Stratus Computer, Inc. fault-tolerant computers. The fault tolerance is necessary because a delay in processing could adversely affect a filer's financial well-being, Lane said.

For example, a delay could cause a company to postpone a public stock offering, possibly forcing it into a period of less attractive market conditions.

Corporations or their financial printers can send in filings on tape or floppy disks. Or, they can use EdgarLink, DOS-PC software that



Source: Securities and Exchange Commission
CW Chart: Michael Siggins

the SEC provides free. EdgarLink formats ASCII data and applies the same checks now done manually by SEC personnel and mainframe batch processing. Wordy financial "boilerplates," stored previously in an Edgar database, can be referenced for automatic inclusion in the final SEC filing.

EdgarLink also includes communications software so filings can be sent to electronically simply by invoking a "send" command. EdgarLink compresses the data before transmission.

Bell Atlantic Corp. has voluntarily filed several thousand pages of financial statements from its Philadelphia headquarters in each of the past several years.

According to Robert Fitzmire,

SEC, *page 67*

Retired HP chief on open systems

John A. Young, recently retired president and chief executive officer of Hewlett-Packard Co., was honored last month by the American National Standards Institute with an award named for him. While in Washington, D.C., to receive the award, Young met with Computerworld's *senior Washington correspondent, Gary H. Anthes, and offered these observations.*

John A. Young: *Open systems demand is growing*

Q. Nearly all vendors say they are committed to open systems. Are they?

A. It is the politically correct position to have, the natural response to overwhelming pressure from users. But there are variations in the level of commitment. If that's not where the bulk of your business is or where the most profitable lines are, you may do a lot of bait-and-switching in which you say, "Yeah, we're in favor of this, but why don't you try that." Fortunately for customers, not only is the demand for open systems growing but so is [the customers'] sophistication.

Q. How strong is HP's commitment to open systems?

A. We are totally committed because we don't have a choice. We decided clear back in the early 1980s to terminate all work on our proprietary networking technology. We have been working for 10 years to make open systems happen.

Q. Did you worry at the time you made this commitment that you would get lower profit margins on standards-based products?

A. No. Don't confuse standards and standardization.

HP chief, *page 61*

Data integrity

Start paying invoices once, not twice

By Mitch Betts

As companies search every nook and cranny for places to cut costs, they may be shocked to learn that thousands of dollars are trickling out of their coffers because they pay suppliers twice for the same invoice.

The combination of human error and inadequate accounts payable software means that, on average, 0.1% of a company's payments are duplicates, according to consultant Bob Fields, president of Fields & Associates, Inc. in Burlingame, Calif.

That 0.1% may seem small, but spread over the whole U.S. economy, it amounts to $3.5 billion in duplicate payments per year, Fields estimated. His firm specializes in helping companies identify and recover overpayments — as much as $10 million for one client.

Every firm vulnerable

Fields has reviewed the payment records of more than 300 companies during the past 20 years and found overpayments at every one.

The cause can be as simple as paying both the priced packing slip and the invoice, or overpayment can be triggered by mistakes in data entry that defeat the software's error-checking routines, he explained.

Most invoice-processing software packages have a feature for preventing or flagging duplicate payments to a single vendor, but data-entry errors can render it worthless because computers require exact matches.

For example, dropping a hyphen in the invoice number or vendor number or spelling a vendor's name in different ways will allow a duplicate payment.

Anatomy of a big mistake

When invoice numbers are entered incorrectly, duplicate payments can result

ACTUAL INVOICE NUMBER	A00027-335
POSSIBLE INPUT ERRORS	
Dropped zeroes	A27-335
Dropped A and zeroes	27-335
Dropped A	00027-335
Letter O instead of zeroes; dropped A	oo027-335
Space after A	A 00027-335
Flush right with "fill zeroes" at left	00A00027-335
Dropped hyphen	A00027335

Source: Fields & Associates, Inc.

Fields said companies need to develop naming conventions for vendors as well as a standard policy on how to handle invoice numbers that are either too long or too short for their software's data field.

Numerous causes

Most inaccurate payments are not intentional or the result of incompetent staff, he said.

"They occur because massive amounts of data are processed by many people, the level of training varies with each company, procedures may be outdated and turnover is at all-time record highs," Fields said.

He claimed the error-checking routines in today's software packages are inadequate. "The systems are designed to pay bills as efficiently as possible," Fields said, "but not to avoid duplicate payments."

However, he declined to provide details on exactly how the software can be improved because the core of his business is using proprietary software — full of error-checking algorithms — that scans a company's records looking for payment errors.

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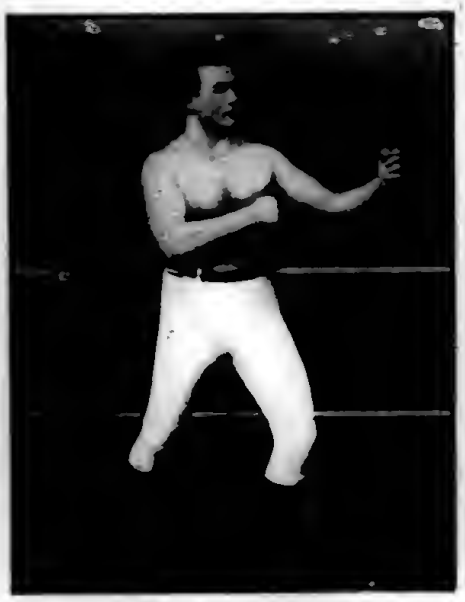
You say: "Wrong. PC- and UNIX-based stuff. Windows. NetWare. *Open* stuff."

They say: "Well . . . So what? They can't image-enable *our* system, anyway. We've got multiple platforms, multiple languages, *all kinds* of networks . . ."

You say: "Wang can image-enable any environment. IBM. DEC. HP. UNIX. Windows. Anybody."

They say (after a pause): "No kidding?"



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HP signs minicomputer deal with 7-Eleven Japan

By Mark Halper
PALO ALTO, CALIF.

Hewlett-Packard Co. recently won a $12.5 million deal to sell five HP 9000 Unix minicomputers and 200 HP workstations to 7-Eleven Japan Co. for sales analysis and other operations.

The deal is part of a general push by HP into the retail business, where information technology is helping retailers assert themselves with their suppliers by better arming them with information about what products are selling, noted Chris Friede, HP marketing manager of retail technologies.

The win marks HP's first foray into the supermarket and convenience store retail automation business, Friede said.

HP's professional services organization — the company's integration arm — is tying the systems into a 7-Eleven-operated Hitachi Ltd. mainframe, which gathers data from point-of-sale terminals at 5,000 stores in Japan.

The new system was designed to make that data more accessible to 7-Eleven buyers and merchandisers.

Retired HP chief

CONTINUED FROM PAGE 59

Standardized things are the same, like milk cartons. But standards are fundamentally essential in order to have innovation. [At one time,] if you wanted a telephone, your choice was a black one with a rotary dial and that was it. Now, with a standard — a plug in the wall — you can get a football phone, a bubble gum machine phone, every kind of phone. You have to think about what happens in the layers above the standard. That's where innovation takes place.

Q. How confident were you that the strategy would succeed?
A. It seemed like the idea of open systems just had to come. But admittedly, it was high risk. Was it this decade or the next decade or the 21st century? There were a lot of headlines in [publications] like *Computerworld* that said, 'HP risks company on RISC.'

Q. Do you have any strategic advice for users considering the new computing paradigms such as client/server?
A. My advice to customers is to spend a lot of time getting informed on the architecture they need to implement their strategic business needs. What are you going to do with your business to succeed in the worldwide marketplace? What are the information needs that are implicit in that strategy? What's the architecture to make that happen? Then you can get some help from vendors in testing your ideas.

Q: Any tactical advice?
A. Get experience with some of these [Unix] machines in a controlled environment. Pick a key application like customer service, where you're undoubtedly getting pressure from the operating folks who are saying, 'Gee, this is not responsive.' Pick one like that and just re-engineer the process and get a client/server solution in.

Q: Is the end of the mainframe at hand?
A: I don't know if we'll live long enough to see the last mainframe plug being pulled and the lights going out. Frankly, some of these old systems are certainly not worth rewriting.

Q: Is Unix ready for heavy-duty, mission-critical applications?
A. The capability is coming up every day. [Proprietary operating systems] offer a richer environment still. But that gap is closing. I don't know whether it is one year or two years, but I think that's the kind of time frame in which the intersection will take place.

Q. Will the recent multivendor agreement to deliver a Common Open Software Environment for Unix [CW, March 22] accelerate this process?
A. Yes, that is definitely part of the objective. It is a very powerful signal to the software community that this is something the vendors are all lined up behind. And for the big data center managers, this is an underscoring of a commitment that this is a fundamental operating system.

Q. Is it also a defense against Microsoft Corp.'s Windows NT?
A. There is nothing that concentrates your mind like the fear of a real big event coming that could have a dramatic impact on your business. It is clear that NT is going to have a powerful position, but all the utilities, all the networking and so forth won't be in NT for a long time. So this provided a chance to bring all the vendors together. We're going to have a powerful operating system that will have many more features than NT.

Q. What contributions has the Open Software Foundation made?
A. Getting the graphical user interface done has been very popular. Also, they have really perfected the process of requesting and getting the best technology assembled and to the market quickly. They have done a superb job of building relationships [to universities and government agencies] so that advanced ideas can be brought in to provide a richer and more powerful offering.

Q. Will we see more vendor alliances?
A. Yes, the underlying driver is [a shrinking] time to market. If your time to market is down 12 to 18 months, and you miss that window very far, you're out of business. So you ask, who do I have to work with to hit the window? You can't do it all; you can't start with a sandpile and build every chip and every piece of code.

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N.Y. bombing delays data center consolidation

By Thomas Hoffman
NEW YORK

The bombing of the World Trade Center in late February has delayed the plans of its owner — the New York/New Jersey Port Authority — to meld a data center at the financial complex into the Port Authority's Teleport facility on Staten Island, according to Wilma Horne, the agency's chief information officer.

The Port Authority, which owns and operates the 16-acre World Trade Center complex, originally had planned to complete the data center consolidation by the end of last month, according to Horne. However, the bombing forced the agency to go into disaster recovery mode with Sungard Recovery Services, Inc., and city officials have not yet cleared the path for Port Authority staff members to return to the building to complete the consolidation efforts.

Port Authority's Wilma Horne *says data center is still in disaster recovery mode*

The Teleport mainframe was originally intended to serve as a backup to the World Trade Center hub, but Horne said the agency decided it would be more prudent to consolidate operations between the environments onto an IBM 3090-400J.

At the time of the disaster, the Port Authority had already loaded some of the software applications onto the IBM 3090, which is running but not yet fully operational. Once the agency is cleared to return to the World Trade Center, the data center consolidation will be completed and the bulk of the 270 mainframe-based applications will be loaded onto the 3090.

Horne was unable to determine when the data consolidation project would be completed. However, sources estimated the Teleport facility would be fully operational by late this month.

The efforts are expected to help the agency automate more of its operations and improve productivity, though Horne declined to elaborate. She said the project will eventually enable the agency to manage its data center operations, a new 12,000-tape automated tape library from Storage Technology Corp. and other operations remotely from the World Trade Center.

"In our long-term plan, there will be no people at Teleport to run these systems. We will be able to do it automatically," Horne added.

Richard S. Wexler, a contingency planning consultant at RSW Associates in Brooklyn, N.Y., was providing disaster recovery consultation to Port Authority staff members at 1 World Trade Center when the bomb exploded. He said the agency is developing remote T-1 and T-4 links between the combined data center location at Teleport with users and administrators at the World Trade Center. Horne denied knowledge of such plans.

Micro Technology's Informer-HSN debuts

By Melinda-Carol Ballou
ANAHEIM, CALIF.

Micro Technology, Inc. recently introduced Informer-HSM, which tracks file activity for hierarchical storage management in Digital Equipment Corp. VAX shops.

Informer is a software utility that extends the VMS file system by providing explicit file access information. It captures I/O activity for files, and that data is then stored in a database to create a master file directory for each disk, which Informer then uses to create reports. Informer can be used with Micro Technology's Virtual Library Manager (VLM) or Archive Manager to determine if a file should be migrated to a faster technology, such as solid-state disk, or archived. It can also be used with Software Partner/32, Inc.'s Hierarchy and Raxco, Inc.'s Archive for the same purpose.

Most existing technologies, including VLM, Hierarchy and Archive, only monitor files that have been modified, so an active read-only file may seem dormant, Micro Technology officials said. Informer was designed to help information systems managers save money by tracking both write and read-only activity, thus enabling managers to weed out those files that are never accessed. It also allows managers to balance the file system and automatically updates the database.

The product is scheduled to ship next month and ranges in price from $395 to $16,000, company officials said.

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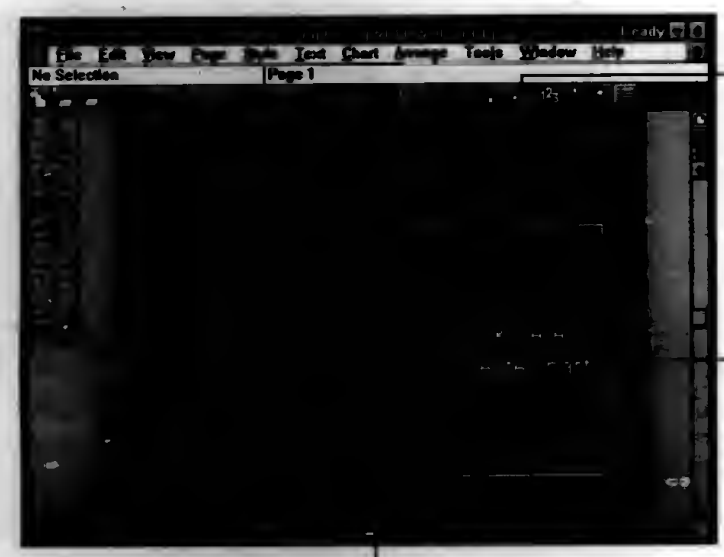

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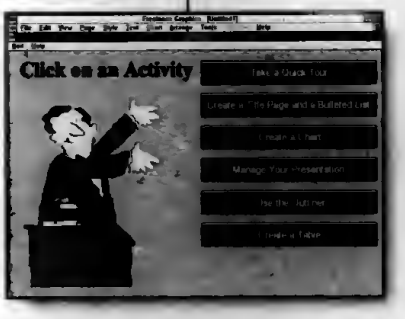

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SEC system

CONTINUED FROM PAGE 59

assistant manager for security financing and SEC matters, the ability to get the filings validated on-site, plus the ability to transmit them to Washington, D.C., in minutes or seconds, adds flexibility to his staff's work load.

SEC CIO John Lane *says that by 1996, the SEC will process 10 million pages annually with Edgar*

"It's really convenient," Fitzmire said. "It saves us from having to have a courier waiting, and we don't have to have people working overtime to check everything the night before a filing is due. In a securities situation, you often have a very short time frame to get something filed."

Edgar currently uses 36 9.6K bit/sec. modems but can accommodate up to 460 modems, according to David Copenhafer, acting director of the Office of Systems Support. He said that as the March 31 deadline for filing annual reports approached, Edgar was moving closer to receiving 1G byte of data per hour.

After processing on the first Stratus system, called Receipt and Acceptance, accepted filings are sent via General Electric Information Services (GEIS) in Rockville, Md., to Mead Data Central, Inc. in Dayton, Ohio, where the centralized database of corporate financial information is maintained.

Users who have CompuServe electronic mailboxes are notified of the status of their filings within 30 minutes.

Internal SEC users — as well as visitors to the SEC's public reference facilities in Washington, D.C., New York and Chicago — can obtain free access to the records by logging onto local-area networks attached to the second Stratus system, called Analysis and Review.

If user queries cannot be satisfied with data kept locally on the Stratus, the request is automatically routed to Dayton over one of four dedicated lines.

Eventually, Mead and other companies buying Edgar data wholesale from GEIS are likely to offer the data to the public for a fee, Lane said.

Troubled past

"In a town riddled with systems that don't work, [the SEC] built one that works," said John J. Lane, the SEC's recently appointed chief information officer. "I think the system is successful. I feel fortunate to have inherited a system that does what it is supposed to do."

If Lane sounds a trifle defensive, it is with good reason. Edgar, the SEC's high-profile system for electronic filing, had a painful birth. In 1985, a congressional panel called a pilot Edgar system a "boondoggle," a "blind stumble" and a "glorified microfiche" system. The panel cited alleged cost overruns and system deficiencies.

Last September, the U.S. General Accounting Office (GAO) issued a report saying Edgar was three years behind schedule and $20 million over its $60 million budget, in part because the number of system requirements had risen from 350 to 900.

Lane pointed out that the GAO had not criticized the usefulness of the system — 1 million lines of C code — and he said the SEC has taken a number of actions to address the GAO's concerns. It beefed up oversight and strengthened communications among managers and users, and it "froze" the system design against all but essential changes, he said.

Even with the $20 million cost overrun, Edgar may be a bargain; an independent study done in 1986 said Edgar would provide a net benefit to filers of $170 million over eight years. —*Gary H. Anthes*

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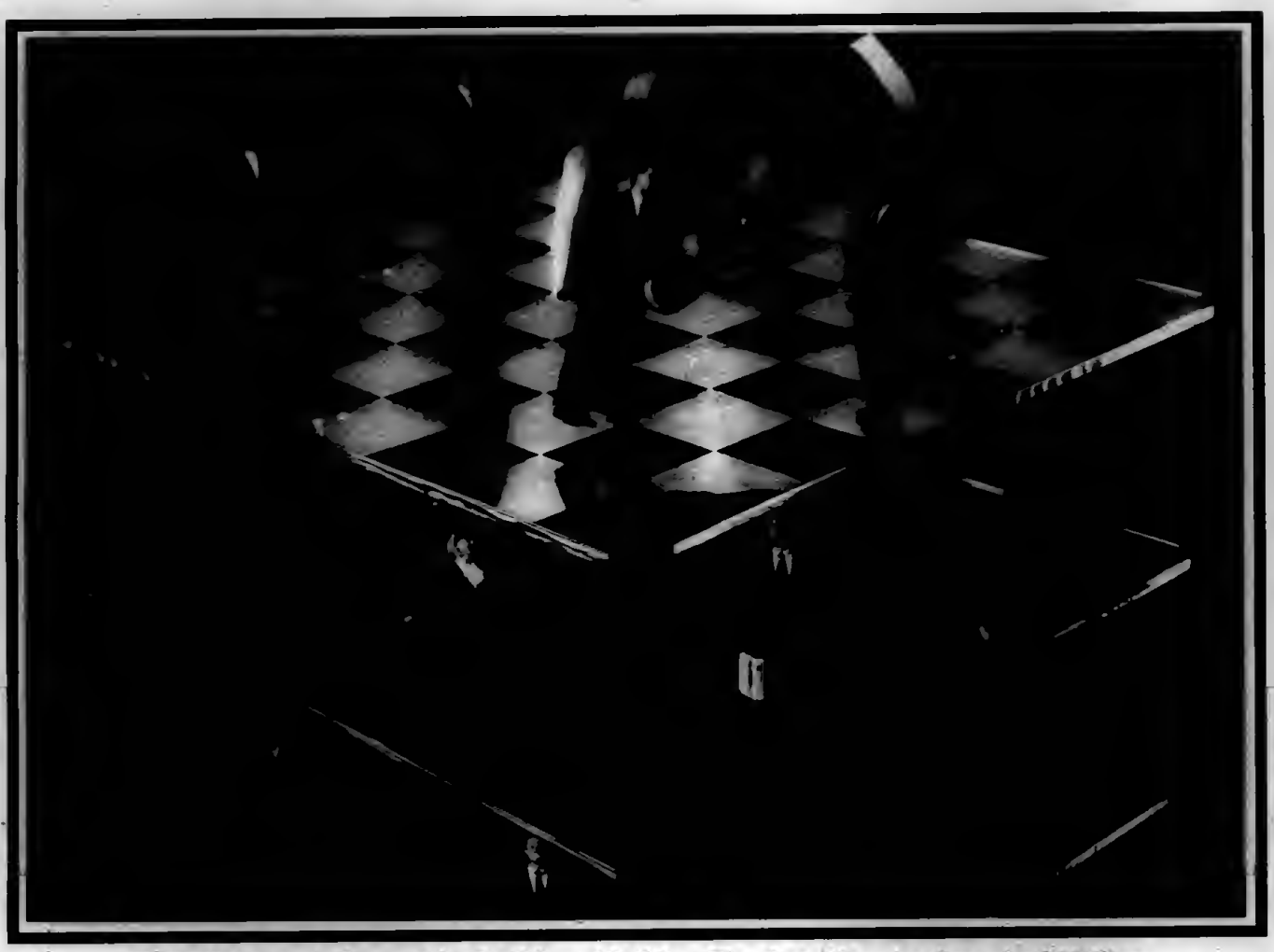

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Application Development

Software quality key to staying competitive

Capers Jones, chairman of Software Productivity Research, Inc., has been measuring programmer productivity for more than a decade. Computerworld *senior editor Garry Ray met Jones at his Burlington, Mass., office to discuss his new book,* International Software Productivity and Quality: The Global Perspective.

Q. What are some of the findings in your book?
A. U.S. programmers are less productive in terms of costs. But if you switch to the effort required to build software, we look pretty good. We're in the Top 3 or 4 in almost everything we do. But there's no guarantee that we'll be the dominant software producer into the next century. We lost the leadership in automobiles.

Q. How do we keep our leadership?
A. First, quality control. Then, we need to invest in technologies that, despite our high labor costs, have kept us advancing and efficient in software production. Notably, things like reusability.

Q. How will object-oriented technology affect productivity?
A. Reusability has a negative value for the first year because you have to construct or acquire your reusable artifacts. Over the second, third and fourth years, reusability seems to have the highest return of any technology you can buy.

Q. You seem to talk about object oriented as a subset of reuse. Why is that?
A. Object oriented is only a partial solution to the reuse equation. Beyond that, there are 10 different areas where reusability is important, such as plans and estimates.

Q. Why do you think companies are doing so much outsourcing? Is it really an economic move?
A. Outsourcing doesn't originate in MIS; it originates above MIS. It originates because the people above MIS regard their MIS folks collectively as a bunch of dunces who don't know the first thing about business and have been out of control or have failed in their daily performance for a long time. It's because of dissatisfaction. If you're satisfied, there's no reason to outsource.

Capers Jones: *Client/server needs quality control*

Q. Is this a critical period in the life of the U.S. software industry?
A. Ed Yourdon in *The Decline and Fall of the American Programmer* said the the U.S. software industry will be the next industry to decline. I'm not quite as pessimistic as Ed, but I certainly share his concern.

Q. Is this necessarily going to happen?
A. No. There are alternate scenarios for the future. The worst-case scenario is that it happens. The best case is that we dominate for another 50 years.

Q. What are the competitive strengths of other countries vs. the U.S.?
A. There are about 40 or 50 key software engineering technologies, and we are ahead in about 15 of them. Europe is ahead in around a dozen, and the Pacific Rim and Japan are ahead in around a dozen.

Q. In your studies of U.S. companies, what has been particularly notable?
A. We studied Baldrige Award winners. One of the most striking differences is that all Baldrige companies measure quality. Even though the Baldrige has nothing to do with software, they measure software quality as well as product quality and user satisfaction.

Q. Do you have any specific observations on client/server development?
A. The quality of client/server applications is not as good as the older technologies. Client software tends to be shoddily and quickly developed.

Q. Why is that?
A. The people building client/server applications don't know about quality control. If you don't use those techniques, you're going to pay for it with high maintenance costs and low user satisfaction.

Q. Then why are companies embracing client/server development?
A. It's an easier decision. A small client system of 5,000 or 10,000 lines of code is a disposable asset. A large system requires more of an investment but lasts much longer. The analogy is that if we get tired of the chairs in this room, we can replace them. If we get tired of this office building, we can't just throw it away.

Measures up

Software Productivity Research uses its Checkpoint measurement tool to compute quality measures and productivity ratings for application development projects. The $20,000 tool, recently announced for Unix and Microsoft Corp. Windows, includes a historic database of development projects collected by Software Productivity Research. New projects can also be evaluated in terms of life cycle, business and maintenance metrics.

BMW's Softlab seeks U.S. foothold

Shift from CASE to re-engineering part of $45 million tack

By Kim S. Nash
ATLANTA

With just one U.S. customer, Germany's Softlab, Inc. will have to work hard to make a name for itself as a re-engineering vendor in the U.S. But parent company Bayerische Motoren Werke GmbH (BMW) is betting that a new chief executive officer and $45 million in financing will put Softlab on the map.

The company recently outlined plans to seize the burgeoning application redevelopment market, which means it is going after large mainframe shops that are breaking down and then redesigning legacy applications to run in a client/server setup.

"For BMW to see any profits from us, we have to crack the U.S.," said Dan Jenkins, Softlab's new president and CEO. Jenkins replaced David Marshall, who resigned after less than two years on the job.

BMW removed Marshall as part of a recent strategy shift away from computer-aided software engineering (CASE) to re-engineering. Softlab has moved its U.S. headquarters from San Francisco to Atlanta, close to KnowledgeWare, Inc., with which Softlab tried to pull off a friendly merger last year. KnowledgeWare rejected the reported $350 million offer [CW, April 6, 1992].

Growing from within

After other buyout proposals also failed, BMW decided to build Softlab's presence here the old-fashioned way: through its own product offerings. Softlab has narrowed its U.S. product focus, targeting its Maestro II product set at redeveloping legacy mainframe applications to run under Unix.

Softlab, *page 73*

Buyout timetable

1988: BMW owns 10% of Softlab, upping stake to 40% in the late 1980s.
January 1992: BMW acquires an additional 35% of the company.
September 1992: BMW buys balance of company.

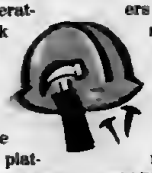
Financial report card

1992 sales topped $110 million, with none coming from the U.S.
1993 is an "investment year," with no major sales expected.
For 1994, revenue of $15 million to $20 million is expected.

Complexity of client/server promotes 4GL use

By Michael Vizard

The complexities associated with building client/server applications across diverse architectures are pushing information systems departments to adopt fourth-generation languages (4GL) that mask the underlying operating systems and network protocols from developers.



Although Microsoft Corp.'s Windows and DOS systems are the most popular client platforms available today, developers are finding that linking Windows clients to OS/2 or Unix servers usually involves hundreds of lines of code written in either C or C++.

"The fact is that most organizations don't have programmers with the expertise to write code in native environments that access databases on multiple servers across a network," said Liz Barnett, vice president of New Science Associates, Inc. in Westport, Conn.

And, in many cases, a lack of programming knowledge is further exacerbated by a Windows platform that presents developers with a number of memory management issues in client/server environments.

"Microsoft is not owning up to the fact that Windows crashes are costing a tremendous amount of money in lost productivity," said Rich Finkelstein, president of Performance Computing, Inc., a consulting firm in Chicago.

To shield themselves from the complexities of building client/server platforms, IS groups have been turning to 4GLs that have been architected for client/server

Client/server, *page 72*

Client/server promotes 4GL use

CONTINUED FROM PAGE 71

application development.

For example, Ontario Hydro Ltd., an electric utility in Toronto, recently built a client/server application using PowerBuilder tools from Powersoft Corp. in Burlington, Mass. At the same time, Ontario Hydro is also beta-testing financial accounting software from PeopleSoft, Inc. in Walnut Creek, Calif., as part of an effort to downsize from custom-built applications on an IBM mainframe to a client/server environment based on Windows clients and OS/2 servers.

"A client/server application may have as much as 200 windows. If you use C or C++, the developer has to code every window. Our tools operate above Windows to simplify development," said Dana Bauer, product marketing manager at Powersoft.

In the future, Ontario Hydro plans to move from an SQL database from Gupta Technologies, Inc. that runs on OS/2 to an Oracle Corp. database that runs on Unix. However, there is a faction at the utility that is pushing Microsoft's upcoming Windows NT because of its support for Windows.

"If we move to NT, we'll probably open up our database standard to include other databases, such as Sybase," said Jeff Goddard, branch coordinator for financial management systems at Ontario Hydro.

Goddard said he is very pleased with the performance of both the PeopleSoft applications and the applications they built using PowerBuilder. "PeopleSoft is one of the leading developers of client/server applications, and the latest release of the PowerBuilder tools are much improved," he said.

In general, the goal of most developers is to keep their initial client/server applications relatively simple using 4GL tools from companies such as Gupta, Oracle, SmartStar Corp., Progress Software Corp., Ross Systems, Inc. or Cognos, Inc.

"The secret to building client/server applications is not to make the application too complex. When you start to look at all the connection issues between different networks and servers you can easily create a Frankenstein situation," said John Calahan, chief executive officer of Timeline, Inc., a supplier of financial accounting software in Bellevue, Wash., that is developing Windows applications.

However, while most initial client/server applications are relatively simple, Barnett noted that IS organizations would do well to specify 486-based systems as their clients. The horsepower of 486 systems would give them a scalable platform for building more robust applications in the future that are likely to be based on 32-bit operating systems.

In particular, developers should note what type of client/server application they need to build. Most client/server applications today rely heavily on processing on the server. But in the future, Barnett said he expects to see applications that exploit the large amount of horsepower that will be available on desktops.

In the short term, however, most IS organizations will simply leverage their installed base of 386 systems.

"Telling people that their future client/server applications are going to be too big for their PCs is not a message that corporate America wants to hear," said Gordon Rabkin, vice president of product development at IMRS, Inc., the Stamford, Conn., developer of the Hyperion business applications for Windows.

"Right now, Windows/DOS is the client, but as IS directors lay down technology specifications, they may have to take into account new software and hardware," Rabkin said.

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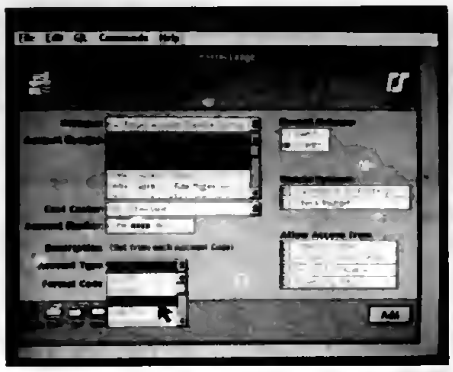

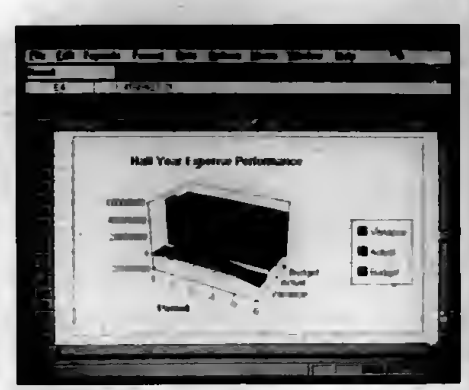

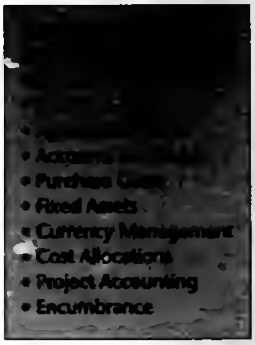

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BMW's Softlab seeks U.S. foothold

CONTINUED FROM PAGE 71

Maestro II includes a repository, project management and application building aids. Kaseworks, Inc., another Atlanta company, recently signed a joint development deal to provide graphical user interface tools.

Softlab's revamp sounds like a good idea, but the company is going against established U.S. vendors, such as Bachman Information Systems, Inc. and Texas Instruments, Inc., which recently made an initial pitch to potential redevelopers along with partner Price Waterhouse.

"Certainly there's a need for this kind of redevelopment plan, but I don't know that Softlab has any expertise in this area," said Martin Garvey, an analyst at Meta Group, Inc. in Westport, Conn.

"There's more to moving to Unix than rebuilding apps," Garvey said, such as systems administration and security issues.

Still, Softlab's repository is a selling point, according to Ed Acly, an analyst at International Data Corp. (IDC) in Framingham, Mass., saying that the store house is easy to use.

BMW's $45 million donation does not hurt, either. Jenkins said he will use the funds to follow through on an aggressive plan that includes the following:

- Sign up six showcase companies this year, to serve as reference sites. "We know we'll have to give away the product to set these up," Jenkins said, "but we're asking for a big commitment from these people, too." He is looking for Fortune 500 firms in a variety of vertical industries that want to undertake "major" client/server redevelopment projects.
- Acquire a small consulting firm by the end of this month to help users implement Maestro II, Softlab's development tool set and repository.
- Partner with a hardware company. "We have good relationships with IBM in Germany and the UK," Jenkins said, adding that Maestro II will be targeted squarely at IBM mainframe downsizers. However, he would not confirm or deny reports of any potential deal with IBM or its Client/Server Computing unit in Armonk, N.Y.

Softlab leads the CASE market in Germany, the Netherlands and the UK, according to Ovum Ltd., a European market research firm.

"But we don't have a good track record in the U.S. Being a foreign company, we have to build trust," Jenkins acknowledged.

Culture no doubt has played a role in Softlab's lack of success in the U.S. CASE market, Acly said. "Not many foreign software vendors have made a go of it."

Competitors on move

Meanwhile, TI and Price Waterhouse earlier this month unveiled the first tool in a product line to analyze and rebuild mainframe software [CW, March 8].

Further, Bachman holds the lion's share of the re-engineering market, according to IDC, and is pursuing client/server redevelopment business with its Model Driven Development product line and other tools. However, the Burlington, Mass.-based company's financials have been up and down recently as well, forcing the company to cut 15% of its 340-member staff in November 1992.

In addition to the deep pockets of its parent, Softlab may have a technological advantage in Maestro II's built-in redevelopment methodology. The Systems Redevelopment Methodology was specifically created for guiding users through the new territory of client/server development by Tactical Strategy Group, Inc. in Aptos, Calif.

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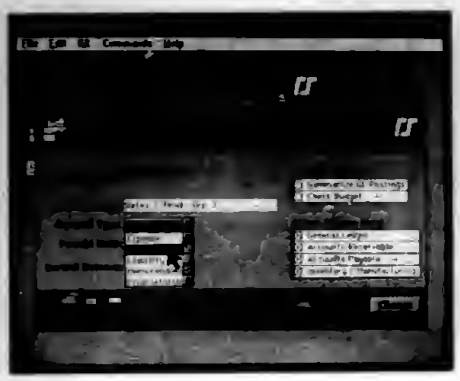

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HAVE TOOLS – NEED BLUEPRINT

Careful planning and user buy-in, not tools, are the key to client/server success, experts say

By Garry Ray

You'd think that by now information systems professionals would know better than to start swinging tools without a blueprint and a full work crew.

But experts warn that many companies now building client/server systems are not learning from past mistakes and so are destined to suffer bruised thumbs and banged heads.

"We see people scrapping two to five years of effort because they went too wild with the tools," says Christine Comaford, president of Corporate Computing, Inc., a consultancy in Sausalito, Calif.

It's easy to understand why companies are tempted to focus on technology: Client/server projects often originate with PC-savvy users and developers who love plug-and-play software and hate drawn-out planning.

Larry Constantine, principal consultant at Constantine & Lockwood, a software development consulting firm in Acton, Mass., says users are often "micro-based people who think of software as something that's cheap and flexible and comes out of a box."

More fundamentally, client/server is by nature a technological concept. It serves as an important cornerstone of distributed computing, downsizing and many other movements that promise cheaper, better and faster computing.

Yet users, consultants and development managers say that a product-driven approach to client/server is a surefire way to ensure wasted effort, chaos and, ultimately, failure. Careful attention must be given to people-oriented issues, they say, or projects will fail.

Think soft

The notion that "soft" factors can make or break a project is hardly new to IS.

Yet some concerns are magnified and stakes are higher because client/server "puts more power into the hands of users," says Bill Bedor, manager of application development at Medtronic, Inc., a billion-dollar medical manufacturer in Minneapolis.

Ken Haase, vice president of IS at the National Futures Association, a commodity industry watchdog in Chicago, agrees, noting that the approach gives users far more "control and responsibility" than the old mainframe-focused environment.

Unfortunately, business departments and users are not always eager to embrace their new, expanded role.

Too bad, says Pieter Minmo, president of Technology Insight, Inc., a consultancy in Marblehead, Mass., because if users are not brought in early, client/server projects can die or never get off the ground. "If users don't show up, you can't make decisions," Minmo says. "That's where the process usually breaks down."

Little wonder that some consultants say that at least half of all time spent on a client/server project should be devoted to organizational issues and planning.

Realistic hopes key

Only when business units are on board, Minmo says, does it make sense to choose tools, which depend heavily on the application.

Experts agree that among the most important tasks is managing user expectations. "Users always think that moving to client/server is going to be a piece of cake; you just plug it in and it will work," Comaford says.

Straight talk is needed to prepare users for the rough reality, Haase adds.

"You've got to talk to people," Haase says, "and explain to them that this is a different world."

And a riskier one. Client/server systems have "more parts and pieces" than other systems, Bedor notes, so they crash more often. While a single mainframe system might experience one serious failure per year, Haase adds, a client/server system has multiple clients, servers and networks that collectively might crash more than 100 times per year.

Clear roles needed

To develop and run such a complex system, experts say it's crucial for IS managers to ensure that each department understands its role in the project.

Ideally, IS should make decisions about infrastructure, including database models, networking and servers, some suggest, while

Have tools, *page 77*

INSIDE. • All together now: A look at work teams in insurance. Page 78

LOTUS cc:MAIL

Awards (1992-1993)

ComputerWorld I/S Brand Preference Winner, February 1992

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Windows Magazine WinAward, February 1992

•

LAN Times Reader's Choice, March 1992, January 1993

•

InfoWorld Product of the Year, March 1992

•

BYTE Magazine Reader's Choice, June 1992

•

BYTE Magazine Award for Cross-platform E-Mail, March 1993

•

Network Computing's Certified Interoperable Application Award, December 1992

•

Network World's Enterprise Technology Award, December 1992

•

Software Digest's Highest Overall Evaluation, 8.7 Rating, 1992

•

MacUser Editors' Choice Award, 1992

•

MacWEEK 1992 Editors' Choice Diamond Award, December 1992

•

UNIX World's Best Product of the Year for 1992, January 1993

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Awards (1992-1993)

PC Magazine Editor's Choice Award October 27, 1992

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Have tools — need blueprint

CONTINUED FROM PAGE 75

user departments should handle desktop applications and operating systems. While meetings between IS and users are rarely fun, they are a must if client/server projects are to proceed.

Bill Lodge, project manager at Turner Corp., a New York construction company that moved off a mainframe and onto client/server in 1990, says that it is impossible to develop applications without users.

"We've done it wrong in the past," Lodge says, "and when we go back and analyze what went wrong, it's always because we didn't have user input."

"The business effort is at least equal to the technology effort... probably bigger," says Howard Rubin, a faculty affiliate at New York consultancy CAP Gemini America and a longtime authority on application development.

Building a solid frame that included both IS and users was the first goal of a client/server project at the Federal National Mortgage Association (Fannie Mae), according to Bill Kelvie, executive vice president and chief information officer at the the quasi-government agency in Washington, D.C.

From the outset of a 2½-year-old effort to move 3,000 employees from mainframe terminals to local-area networks, the agency, which secures more than $1 billion in home mortgages, also "built a strong data resource management team," Kelvie says.

IS must refocus, too

Lest you be tempted to heap all blame on users, don't. According to consultants, IS groups frequently can be obstacles to client/server success.

Experienced hands say the problem is especially serious in large, well-funded companies driven by a "fast and flexible" mentality. That is exactly the opposite of the careful up-front planning that client/server requires.

It's crucial that mainframe, networking and end-user groups in IS put aside parochial interests and function as a team, says Lucy Lockwood, another principal at Constantine & Lockwood. She suggests that cross-training is a good way to break down intra-IS barriers.

"Provide networking, the mainframe department and end-user computing with cross-functional training," Lockwood advises, "so that everyone knows some of the other group's technology."

Consultants warn strongly against adopting an old, hierarchical approach to system development, led by an omnipotent CIO.

"With a single person making the decisions, all of the needed voices will not be heard, and useful knowledge will be excluded from the table," Lockwood says. Comaford adds: "The point that developers miss is that users will do a lot of design work for them."

Implementing strategies

Consultants and users say there are a variety of ways to better implement client/server systems. Among their recommendations:

- Plan for cross-group training so that each department knows something about each others' systems.
- Allocate at least 50% of the total project schedule to planning and formal business process re-engineering.
- The linear, "waterfall" development life cycle does not work well in client/server planning and development. Instead, from the outset, plan on an iterative approach involving users and development groups.

Meet, meet and meet again

Once a basic outline has been sketched, consultants say concerned groups should meet to assess current business processes and information systems.

Companies ignore this step at their own peril, Rubin warns. He recounts how one multinational chemical company jumped into a mammoth client/server project with too little organizational planning and ended up with predictable results. "The business was not ready to change its business structure or its business processes, so [the project] fell apart," he says.

Ongoing meetings can be formal or informal, as long as they happen. Medtronic has been holding such sessions for more than four months.

Bedor, who describes the sit-downs as "just hard work," not tea parties, sees the dialogue as a crucial step to the company's client/server success.

After discussions of key issues, users and IS staff go back to their home organizations to talk more with peers. "We just beat on [the design] until we have the answers," Bedor explains.

At Fannie Mae, Kelvie says, discussions have helped reduce the project to workable size. "We look at the business case, hammer out a script for the project and break it into small chunks." The secret? "We locked the business and systems groups in the same room for a week," he says.

"We locked the business and systems groups in the same room for a week."
—Bill Kelvie
Fannie Mae

"With a single person making all decisions, needed voices will not be heard."
—Lucy Lockwood
Constantine & Lockwood

Some consultants suggest the use of more formal, professionally facilitated approaches, such as Joint Application Design (JAD) and Rapid Application Design (RAD).

"JAD and RAD sessions are an exceedingly good answer," Minnn says, "because they bring users and IS into a facilitated group to talk to each other."

Kelvie shares the enthusiasm; he says Fannie Mae's JAD sessions have been so successful that the agency is now creating internal guidelines based on work with an outside consulting group.

Keeping on track

Once work begins, organizing groups to maximize productivity and handle the fast turnaround required in client/server projects becomes paramount, experienced hands say.

For instance, users might be required to sign off on prototyping schedules, Comaford suggests. "If they miss the schedule, we say 'Sorry, catch us next time around,'" she says.

Similarly, developers can be kept on track with productivity guidelines. "Programmers can get so enamored with the new environment that they'll spend all day developing the right screen," Comaford says. A better approach: Create several different screens and let users choose.

Indeed, IS managers say it's an ongoing challenge to keep things rolling.

At Medtronic, for instance, Bedor says it's been a major challenge to rally the 10 engineers involved in the prototyping effort to come to a consensus on the design of the software. "Getting the individuals sharing the system to do things in the same way has been a challenge," he acknowledges.

Lodge says IS managers must also be prepared to deal with difficult changes during client/server development projects.

"We were taking our payroll off-mainframe," Lodge explains. "We were trying to retain payroll experts who were our programmers, and there was a cultural shock. Some mainframers went through a cultural shift. It was a difficult period."

Done right, Lockwood says, client/server development is like building a house. "There are contractors, architects, carpenters and electricians. They're not working as an integrated team, but they are definitely working in partnership." •

Intelligence Files

Going global

Becoming a "global corporation" is currently in vogue, but many of the strategies that organizations use to achieve that end are unproductive, according to a recent study of 43 U.S. firms.

For example, the study notes that things such as setting up global divisions, cross-border task forces and globally integrated management information systems have little or no correlation with the financial success of a corporation on an international basis.

However, the study did find 11 strategies that work, such as requiring international experience for advancement to top management. Another successful strategy: Linking international managers with a global electronic-mail network.

Source: "Organizing for Global Success," McKinsey & Co., New York.

Skills gap?

A recent survey of 420 electronics industry executives by the American Electronics Association found that 55% of the vendors believe that a "skill gap" is hampering their efforts to implement quality programs.

Profiling 'softlifters'

Why do people engage in "softlifting," the practice of stealing computer programs by copying them instead of buying them?

According to faculty members at Northwestern State University of Louisiana, a person's decision to copy software is based not on "ethics" but on a variety of other factors, including the following:

- A stimulus to act, such as an employee needing a software package for working at home, or a situational factor, such as not having time to make the purchase.
- Personal factors, such as gender, religion and self-concept. "Women are less likely [than men] to pirate software," said Debasish Banerjee.
- Sociocultural and legal factors, such as workplace policies, laws and the actions of peers and supervisors.

Source: Paper by Debasish Banerjee, Claude Simpson and Penny Simpson, Northwestern State University of Louisiana in Natchitoches, La.

Compiled by CW staff.

It's time for teamwork

Insurance firms recognize the importance of synergy

By Nell Margolis
DALLAS

Where re-engineering is afoot, look for self-directed work teams, say information systems executives exploring the territory.

At the Life Office Management Association (LOMA) annual conference recently, "team" was the buzzword du jour. Although many of the 1,000 insurance IS professionals in attendence acknowledged that snags were inevitable, few are heading back to hierarchical structures.

"We've got a long way to go, but we're excited about getting there," says James Geotsch, lead systems analyst at Unum Life Insurance Co. in Portland, Maine.

The nation's traditionally most conservative companies are putting on pioneer shoes for one reason, their executives say: There's no alternative in a commoditized market that is breeding steep competition.

As a result of shared commitment, responsibility and reward, "Teams foster the skills and motivation to adapt quickly to changes," Gentsch says.

Amid re-engineering initiatives that make change a fact of daily life, "We can't afford *not* to try self-directed work teams," says Geotsch, whose company fielded its first team pilot a year ago.

E. P. Rogers, vice presideot of computing services at Mutual of New York (MONY) in Syracuse, N.Y., says that during the last two years his 168-person department has evolved into a 95-person league of self-directed work teams. He claims that service levels, customer satisfactiou and morale have greatly improved.

Not a cure-all

But even avid boosters of the team approach caution that, like the re-engineering efforts it aids, teamwork is oo quick fix for whatever ails an organization.

"It isn't for everyone," says Chris Jermyn, assistant vice president of computing services at MONY. It also isn't for anyone who thinks that the process will be qoick or easy, she adds.

Others are still more cautious. "I'm not yet convinced it's going to work," says Karen Cornwell, a quality consultant at London Life in London, Ontario.

Cornwell's eight-year-old departmeot was chosen as a pilot for a teamwork experiment because its small size and relatively unorthodox mission suggested it might accommodate change less painfully than a larger, more conventiooally trained group.

In retrospect, Cornwell says, that thinking still looks smart. However, she adds, the firm underestimated the "people issues" and politics of eveo the most hedged transitioo to teamwork.

"We're still grappling with all the problems of self-direction," Cornwell notes. "Teamwork is easy in good times, hut wheo you're up against the wall, difficult questions arise. Is everyone supposed to be equal? If so, how can we recognize peoples' different strengths? How much empowermeot do we really have? How much do we really *want*?"

Never turning back

Still, her team recently voted itself a second year of existeoce.

And at MONY, Command Center specialist Bonnie Miller — a former computer programmer who says she spent mooths pining for the familiar compatibilities and satisfactions of her preteam department — has a one-word timetable for returning to the old ways: "Never!" she says.

"There are things I would have done differeotly," she acknowledges. "On the company's side, I would've liked to see leadership people get more input from the rank and file. You can't just say, 'Poof! You're empowered.'... For my part, I would've given up my old ways sooner. But I can't imagine going back — it would seem way too stifling."

Tips from the trenches

There are three keys to successful team implementation: "Communicate, communicate and communicate," says Chris Jermyn, assistant vice president of computing services at MONY in Syracuse, N.Y.

"It's suicide to do this without training," says E. P. Rogers, MONY's IS head.

A reward system tailored to individual accomplishments won't work for teams, says Cigna Corp. Vice President Eric Scheffler. His department tossed out its traditional employee evaluation model and created a new one around group accomplishment.

Executive Track

Former life insurance executive **Robert H. Flast** is the new chief information officer at New York-based executive recruiting firm **Russell Reynolds Associates, Inc.**

Flast, who most recently served as vice presideot of information systems at Metropolitan Life Insurance Co., has also teamed up with his wife to co-author several books on the business applications of PCs.

In Longview, Wash., **William J. Nowoy** has been named vice president and CIO of **Columbia Bank FSB**. He is responsible for the bank's full complement of computer and telecommunications systems.

Nowoy, a 30-year veteran of banking IS, most recently served as data processing manager at Great Northwest Bank in Bremerton, Wash.

Carlson Cos., a $10 billion travel services firm in Minneapolis, has a new IS head. **Rex Carter**, a longtime Electronic Data Systems Corp. veteran who most recently served the company as senior manager of business development, became vice president and CIO at Carlson last mooth. He replaces **James Goodlett**, who picked Carter as his successor and is currently mulling his oext career move.

John C. Bennett, 51, has beeo oamed vice president of infrastructure and systems at the **Long Island Rail Road**. Bennett had served the railroad as vice president of planning and systems.

The **Data Processing Management Association** recently named **Robert A. Dengler** as its executive director. A seasoned executive with deep roots in association management, Dengler comes to the Park Ridge, Ill.-based IS managers' professional association after serving as associate director of administrative services aod meetings at the International Reprographics Associatioo in Oak Brook, Ill.

Have you, or a colleague in the information systems field, recently been promoted? *Computerworld* would like to share the news with the rest of the IS community. Please contact Senior Editor Nell Margolis at (800) 343-6474 to pass the news along.

Calendar

APRIL 11-APRIL 17

FOSE. Washington, D.C., April 12-15 — Contact: National Trade Productions, Inc., Alexandria, Va. (703) 683-8500

APRIL 18-APRIL 24

The Fifth Annual Data Administration Management Association (DAMA) International Symposium. Boston, April 18-21 — Contact: DAMA International Symposium, Boston, Mass. (508) 967-7132.

Patricia Seybold Group Spring 1993 Conference. Boston, April 18-23 — Contact: Deborah Hay, Patricia Seybold Group, Boston, Mass. (617) 742-5200.

Supercomm '93. Atlanta, April 19-22 — Contact: Telecommunications Industry Association, Washington, D.C. (202) 457-4912.

APRIL 25-MAY 1

Xplor International's Vendor Interaction Symposium Information Opportunity Networking '93. Denver, April 25-28 — Contact: Xplor International, Palos Verdes, Calif. (310) 373-3633.

Marketing the IS Organization Internally. Philadelphia, April 26-27 — Contact: Ouellette & Associates Consulting, Inc., Bedford, N.H. (603) 623-7373.

The Softool User Group. Santa Barbara, Calif., April 26-28 — Contact: Softool Corp., Goleta, Calif. (805) 683-5777.

USE/Plus/CUBE Exposition. Phoenix, April 26-28 — Contact: The Sanford Organization, Wauconda, Ill. (708) 526-2010.

National Computer Graphics Association (NCGA) Solutions Applications for Implementation '93 Conference. Philadelphia, April 26-29 — Contact: NCGA, Fairfax, Va. (703) 698-9600.

Third Sourcing Interest Group (SIG) Conference. Chicago, April 27-28 — Contact: SIG, Sherman Oaks, Calif. (818) 784-7755.

Distribution/Computer Expo '93 — Exhibit and Seminar. Chicago, April 27-29 — Contact: C. S. Report, Inc., Uwchland, Pa. (215) 458-8926.

Incotek '93. Warsaw, Poland, April 27-30 — Contact: Global Technologies, Inc., Washington, D.C. (202) 797-3782.

MAY 2-MAY 8

The Workflow Conference on Business Technology. Boston, May 3-5 — Contact: The Workflow Institute, Alameda, Calif. (510) 769-9627.

LotusWorld '93. Boston, May 3-6 — Contact: Danielli & Keefe Associates, Sudbury, Mass. (508) 443-3330.

DB/Expo '93. San Francisco, May 3-7 — Contact: NDN Enterprises, Inc., Mountain View, Calif. (415) 966-8440.

James Martin World Seminar. Boston, May 3-7 — Contact: Extended Intelligence, Inc., Chicago, Ill. (312) 346-7090.

Dev Con '93. Costa Mesa, Calif., May 4-6 — Contact: Franson, Hagerty & Associates, San Jose, Calif. (408) 453-5220.

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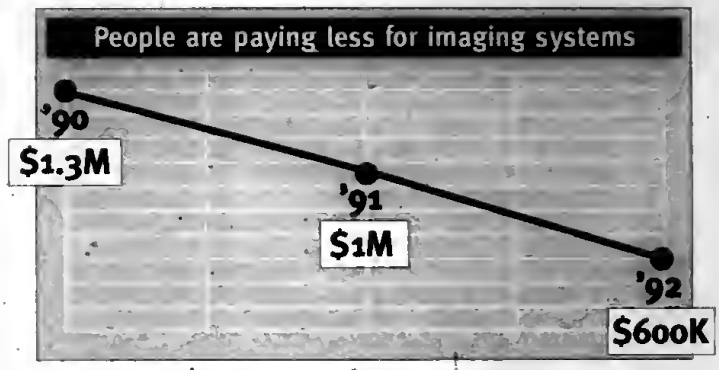
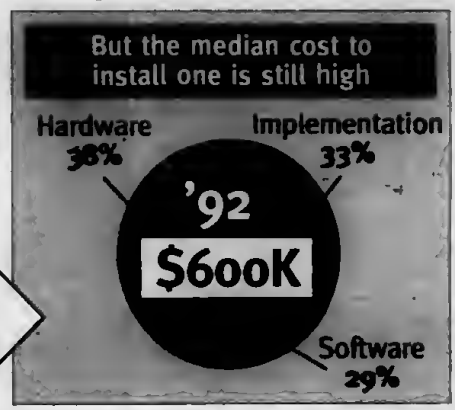
Cost-effective imaging? Perhaps.





Numbers reflect the median price paid by users to purchase and implement an imaging system, from a 1992 study.

Low-cost? Probably not.

Good news: Imaging products can now be bought for a low price. Trouble is, the lowest-cost products ($1,000 per seat) will run out of steam quickly. Not until you get into the realm of $5,000 to $10,000 per seat do you get into products that can grow with your needs.

But back to the good news. Even the $10,000-per-seat products are 25% cheaper than the old-guard imaging systems from the likes of IBM, Wang Laboratories, Inc. and FileNet Corp. Because these middle-tier systems mostly run on PC local-area networks and use industry-standard databases, many companies won't have to make a huge investment in a new infrastructure. ● Good things are also happening at the very low end. Never have such unique features been available for a small investment. (See *page 82* for a discussion of low- to high-end products.) Even popular packages offer imaging (see our review of Lotus Development Corp.'s Lotus Notes: Document Imaging, *page 89*). ● The service and support that's available is also top-quality because it's increasingly being done by the vendors that started the industry. (For more on service and support, see *page 91*. *For user satisfaction ratings of IBM, Wang and FileNet, see page 90*). ● Is imaging "worth it"? We spoke with users who think so. One says he saves $80,000 a year in office labor and paper costs alone. (For a case study, see *page 85*). ● The secret is, don't expect to start with a "showcase" application. Not everyone is American Express. Most people are better off setting short-term goals and applying the technology to a smaller workgroup before establishing a precedent for the enterprise. •

Imaging for everyone

You no longer have to dive into imaging. New products let you start small.

By Thomas M. Koulopoulos

Imaging is no longer relegated to the showcase applications of the Fortune 100 or organizations brave enough to undertake massive re-engineering efforts. Plummeting software and hardware costs are on the brink of creating a commodity market, and although cost is still a consideration, it is no longer the key obstacle for most evaluators (see box at right).

The latest breed of low-cost imaging products speaks to the value of implementing imaging department by department rather than across the entire enterprise all at once.

Enterprise imaging at one time required dedicated hardware, extensive customization and a high level of financial and organizational commitment. It was characterized by the likes of IBM, Wang Laboratories, Inc. and FileNet Corp. Enterprise applications were large-scale, with lots of users, a huge investment and a long payback cycle, measured in years.

Two years ago, however, a small cadre of what were thought to be insignificant vendors was busy developing and installing relatively low-cost imaging systems intended for workgroups of 20 to 50 users on local-area networks. Companies such as LaserData, Inc., Compulink Management Center, Inc., Viewstar Corp., Sigma Imaging Systems, Inc. and others were busy addressing the needs of people who couldn't afford enterprise imaging.

Today, an even lower cost category of mostly Microsoft Corp. Windows-based products has emerged. These are the first shrink-wrapped imaging products, intended for plug-and-play use, even for single users of an imaging application. With all this activity, you have to wonder if lower costs and easier integration makes it any easier to achieve the goal of most imaging systems: more efficient document management. If it does, will the initial low-cost workgroup solution be able to grow into a cost-effective imaging system for the enterprise?

Vendors of lower cost imaging products certainly want you to believe that, and in some cases they may be right. The answer, however, is not that simple.

A good way to find out is to take a closer look at the various categories of imaging products. Today, there are nearly 100 imaging products from which to choose. A good way to categorize them is to look at the key differentiators of every imaging system: customizability and scalability. After all, there are two certainties with any imaging system: It is bound to change, and it is bound to grow.

By customizability, we mean the ability to change the application as time goes on. Among products, there are two extremes: low-cost, off-the-shelf products with little customizability potential and higher priced tools-based systems. By scalability, we mean the ability to add users and expand the system to other departments. Available systems range from single-user to enterprise-capable.

Using these two characteristics, we can plot some well-known imaging products in a matrix, according to their primary position and capabilities (see chart this page).

LOW END (LOWER LEFT): Most confusion today rests with these products. That's probably because the largest number of new product entries is in this space. These not only represent inexpensive, usually Windows-based Imaging systems but also, in many cases, include add-ons for basic optical character recognition (OCR), fax, scanning, work flow and text retrieval.

Products of this type can be beneficial for introducing users and workgroups to imaging at a low cost. But the tools provided to build applications are minimal and may lead to a hard stop as user demands for customized applications and interfaces increase.

Certainly for some companies, paper elimination is a significant improvement in productivity. Entry-level tools, such as ImageFast Software Systems, Inc.'s ImageFast or Keyfile Corp.'s Keyfile, can help in that regard.

Other packages, such as Westbrook Technologies, Inc.'s File Magic, provide a complete environment for imaging, including OCR, text retrieval and basic work flow for a minimal investment.

HIGH END (UPPER RIGHT): These products are highly customizable because they include

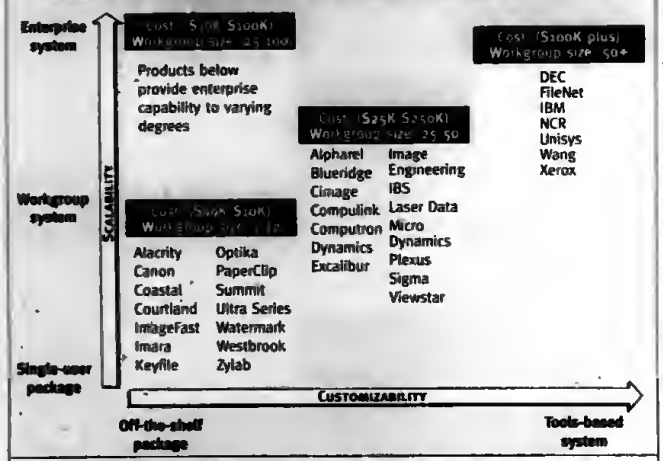
Room for improvement

Where imaging systems really need to improve, according to a survey of 400 users at Delphi Consulting Group, Inc., is in their ability to integrate with existing systems and applications. When it comes to the greatest obstacles to implementing an imaging system, organizational and technological issues dwarf the cost issue, even though 27% of users find it to be a hurdle. Users are concerned with the approval process (45%) and process changes (15%) as organizational issues. Technological issues included the fact that imaging is a new technology and lacks standards (12%).

Koulopoulos is president of Delphi Consulting Group, Inc., a leading imaging consulting firm in Boston.

Market view

It is difficult to categorize imaging products. Instead, we've grouped some popular systems according to their scalability, price range and the extent to which they can be customized.



- Products to the lower left have a low-cost entry-level price but can often scale into enterprise solutions (upper left) to the extent that the company uses a common GUI such as Windows and doesn't require customization.
- Products to the upper right often cost more but allow for extensive customization and integration with existing applications and large numbers of users.
- Products in the middle box provide a wide range of scalability options and customization tools. Their cost can, however, quickly mount in an enterprise application with a large number of users.

Source: Delphi Consulting Group, Inc.

Before you leap...

What you don't ask about an imaging system could hurt your business. The following questions force you to focus on the issues that are often overlooked during imaging evaluations.

- Has a system audit been conducted to determine the media to be accessed, such as electronic, paper, microform, etc.?
- How much of this information will be converted?
- What will back-file conversion costs be? Depending on factors such as document quality, OCR characteristics, compound images and text, you will spend between 50 cents and $4 per page.
- Will users need to access the information based on descriptive text through a content-based retrieval functionality?
- Has a sponsor been established to organize, push along and promote the development of the system?
- Has a methodology been used to determine which applications are best suited for imaging and which will act as the pilot?
- Has a set of organizational metrics been identified for gauging the pilot's success?
- Which standards are supported? Look for existing or proposed standards such as CCITT, G3/G4, ODA/ODIF for image format and compression; Fiber Distributed Data Interface for networks; TWAIN for peripherals; and Integrated Services Digital Network for telecommunications.
- Is an integrated database part of the system, or can one be easily linked to it?
- What are the network requirements?
- What are the legal ramifications of using the system on regulatory, evidentiary or records management requirements?

Imaging

a usually proprietary fourth-generation language (4GL) and a library of callable modules often written in C. People who choose these products are usually planning a process redesign project and have the resources to customize interface components and integrate multiple applications and technologies.

These products are also relatively expensive, especially because you have to purchase the entire system — including the hardware in many cases — and the vendor tends to provide significant support in the implementation and integration effort.

Vendors in this category — such as FileNet — have attempted to address the cost issue through user-based pricing models. In fact, hardware and software costs may not be radically different from lower end solutions in large workgroups. The more significant cost is in business analysis and the level of integration required.

MIDTIER (MIDDLE): These products — usually based on industry databases and languages and able to run on existing PC LANs — provide scalability and customizability at a moderate price. Their cost, however, can quickly mount in an enterprise application with a large number of users because of the customization and integration involved.

So far, products in this category are not yet installed in a large number of enterprise environments. In addition, these systems do not have the traditional track record of major vendors such as IBM. Some of these vendors, such as Sigma and LaserData, sell mainly through value-added resellers, which perform the integration, rather than the vendor itself.

As the market matures, however, this category will grow the fastest, drawing both high- and low-end vendors.

LOW END/ENTERPRISE (UPPER LEFT): "Enterprise/off-the-shelf" is a category that many would claim is an oxymoron. But the advent and strong appeal of Windows, coupled with the broad use of networks and electronic mail, have established an infrastructure and a precedent for this type of imaging. The integration of Watermark Software, Inc. with Beyond, Inc.'s Beyond Mail or the integration of imaging with Lotus Development Corp.'s Notes (Lotus Notes: Document Imaging) are examples of this approach (see page 89 for reviews of Lotus Notes: Document Imaging).

The availability of a standard graphical user interface (GUI) such as Windows is an absolute must for this type of solution. Products strongest in this category are those that take full advantage of Windows tools such as Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) and have support for popular networks.

What is not available in these solutions is the ability to tightly integrate imaging with existing application and customized user interfaces through a 4GL or extensive application programming interface (API) library.

Compress it

Compression and decompression of images is a must. At one time, the only viable alternative was additional hardware for the server and the client. Today software from vendors such as Xionics, Inc., Kofax Image Products, Inc., Decomp and Pixview is not only viable but also preferable in many cases where the host processor is based on an Intel Corp. i486 or on reduced instruction set computing.

Three levels of integration

This — integration with existing applications and user interfaces — is where the greatest area of debate can be found in discussing cost-effective imaging. There are at least three distinct levels of integrating imaging with an information system.

The first level is achieved through the GUI, such as Windows, which provides basic hooks into other applications. This approach is appropriate for basic imaging requirements but offers, at best, a loose coupling between the imaging application and other applications. Products such as Greengage Development Corp.'s FilePlus, ImageFast, Imara Research Corp.'s Imara Lite and Keyfile are examples of this.

The payback of these applications is in paper elimination, faster access to documents and the transfer of images through a messaging or work-flow process. Other applications, such as a spreadsheet or a word processor, can be tied into the imaging environment through OLE and DDE, which launch the application directly from the image interface.

The second level of integration provides for the linking of the imaging system to other ap-

Imaging for everyone, *page 85*

What is imaging?

Every imaging system, small and large, consists of the same basic array of six components.

Capture or scanning

The imaging process starts with documents or images being converted into digital form, usually via a scanner. Optical character recognition (OCR) may also be involved to make it possible to edit the image.

Scanning introduces numerous issues for the imaging system. Support for scanner drivers, throughput rates, double-sided scanning, character recognition, accuracy and speed, compression and image formats used, forms removal and document quality are just some of these. Luckily, even low-end solutions today provide a broad range of options in each of these categories.

Indexing

The indexing capabilities of low-end, off-the-shelf products differ dramatically from high-end, customizable solutions. The primary difference is the support of a standard database. A proprietary database will create havoc if you decide to migrate to another imaging system or want to integrate multiple systems.

Another dimension to indexing is not found as easily in most products: the ability to index the complete text of a document, often referred to as full-text retrieval. You can either integrate a third-party product, such as Cimag's integration of Fulcrum, or get the imaging vendor's proprietary offering, such as Compulink's embedded text retrieval. These systems must also provide an OCR component to convert the scanned image to text.

Storage

Few systems provide storage as part of the system, but there are exceptions, such as Micro Dynamic's Mars and Pinnacle Micro's Paperless 1.

Bundling isn't necessary because optical storage is easily integrated. Problems may come into play, however, in client/server architectures. Here, the support of a particular network can become a critical issue.

The intelligence of the imaging system's storage configuration is also something to consider. For example, how are jukebox operations handled? Is caching to disk or memory provided? What network services are used to avoid bottlenecks and long queues?

Printing and display

Most users will want a large monitor; otherwise, they'd have to scroll, pan and zoom to view multipage documents. Despite software advances, such as scale-to-gray capabilities that enhance black-and-white images, screen size is still a key ergonomic factor.

Don't dismiss the importance of paper output. Since standard laser printers do not accommodate large image files, you might consider upgrading to a departmental printer or using an imaging accelerator. Some vendors, such as LaserData, provide added intelligence to speed printing. Most offer third-party accelerator boards, such as Kofax, to accelerate printing.

Work flow

This is the process by which images are distributed to appropriate people on the network. Capabilities of imaging products vary considerably here. Two basic alternatives exist. In the first, the images exist only in compressed format on the image server and are sent to the client for decompression and viewing.

The second — work flow — is being claimed by virtually all image vendors. True work-flow automation requires a sophisticated set of tools to define routing rules and report document activity use. Few vendors actually provide this level of functionality. Some who do include Computron, Keyfile, FileNet, Viewstar, Plexus, I Levy, IBS, Sigma and Summit.

Retrieval

Retrieval is intimately tied to indexing. A database management system approach will provide key-field retrieval for a set number of items that are entered manually by a data entry operator during the scanning process or extracted by a field-oriented OCR. A full-text approach will provide retrieval on any text item within the document that was capable of OCR during scanning. Most products offer a DBMS approach.

Send Three and Sixpence We're Going to a Dance

by Scott McCready

As the old British joke goes, a daring group of soldiers during World War 1 sent an urgent message to Group HQ, "Send reinforcements we're going to advance." The message was subsequently passed from person to person down the trenches until it reached HQ. At that point it was interpreted as "Send three and sixpence we're going to a dance."

As the advocates of reengineering rapidly form ranks, we hear a great deal about the glory, but very little about the challenges or risks associated with re-engineering. However, even the simple task of getting senior management directives correctly interpreted in the trenches of the workplace can be problematic. Reengineering is useful as a rallying cry for US business that "all is not well." However, the re-engineering banner, while flying high, may not be the appropriate regiment to bet the life of your company on.

Re-engineering all too often plays on the adages of old, i.e., there is an optimal business process or structure, and you cannot automate an activity that resists definition.

Welcome to the world of workflow — in which there is no ultimate process or structure except the ability to re-configure processing resources in real-time, and there is something better than simply tools to cope with the "indefinable process."

What workflow software provides is a general set of tools that are flexible enough to manage a wide range of business objects and processes — sort of an "open computer-integrated manufacturing environment."

If you're an IS manager whose voice may be heard but not always correctly interpreted within the trenches, plan on attending Workflow '93: Turning Point.

For more information call 1-800-343-4952.

McCready is a principal at IDC/Avante Technologies, a market research firm in Framingham, Mass. The company recently completed a 1200 page report on workflow software entitled, "Workflow Software: Challenge for the 1990s."

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reality check

Application: Tracking blood donations.

Application requirements:
- No disruption of current applications and data.
- Diverse platform support.
- Ability to share information with existing database management system.

AIDS has put an enormous burden on health care providers and blood banks. Hundreds of dollars are spent testing every blood donation. The paperwork required is overwhelming, and the process has to be flawless.

The systems on which blood data is tracked must be certified by the Food and Drug Administration and therefore cannot be altered without significant elapsed time and cost.

As a result, blood banks needed an imaging solution that did not interfere with the existing systems in any way.

Image Engineering, Inc. was the chosen system because it didn't require modification of preexisting programs or code.

Several new vendors have taken this approach through the use of existing systems facilities for application integration. Watermark Software, Inc. uses Microsoft's OLE, for instance, and Paperclip Imaging Software, Inc. uses a screen-based method of associating alphanumeric screen display items with images.

Certain questions should be considered when you choose a system like this: Does the integrity of the images and the database need to be synchronized; that is, if you delete an entry in the database that refers to an image, does the image still exist? Is the integration seamless, or will users be required to jump back and forth from one product to another?

In most cases, these issues are easily resolved.

Case study

Preserving investment

By Robert Knight

Exactly 301 years ago, the concerned citizens of Salem, Mass., decided the community would be better off if its witches departed. They did, by way of a place on the road to Boston, now known as Gallows Hill.

Today, Gallows Hill is a park (bewitched, some say), and its records are available somewhere in the archives of Essex County. These records aren't part of the county's automated document imaging and retrieval system, but an estimated 4 million other records are. They reside in an indexing system on a Unisys Corp. A6 mainframe, flanked by a local-area network that provides imaging chores.

Essex County's Michael Miles: *'I don't think you should allow a vendor to tell you what your business is'*

The automation of Essex County's Registry of Deeds, which covers most of the state's North Shore, began 17 years ago, when the registry decided that the manual processing of mortgages, liens and other land documents could be streamlined and made more cost-effective.

"When I came here in 1977, we had 70 employees processing 250 documents per day," says Michael Miles, assistant register. "Currently, we have 45 employees, processing 600 to 800 documents per day."

This is largely because of the registry's most recent and most promising project: the implementation of the Infolmage Folder, a $500,000 LAN-based imaging system from Unisys that acts as a front end to the mainframe. Running on a DOS workstation, this electronic file folder management system automates the movement of paper-based information.

Before this addition, processing one document took about three weeks. Now, incoming land deeds are captured and stored as electronic images to which electronic notes — such as annotations and comments — can be attached.

Two key factors enabled the existing mainframe and new imaging system to work together cost-effectively, Miles says.

First, the indexing system was designed and executed in-house. "It was a solution designed by people who work with it everyday," he says. "I don't think you should allow a vendor to tell you what your business is."

Second, the new imaging system was designed to work with the mainframe system, not to take its place. "It could have been a big deal if we weren't thinking about maintaining our existing investment," Miles says.

In addition, he says, "because the imaging system is an open system, in the future we're going to add more to it for more productivity."

One of the bigger paybacks of the system is the "duplex video laser printing," Miles says. This provides the hard copy of the documents required by state law. Miles figures this function alone will achieve payback in three years plus an additional $80,000 per year that the office saves on labor, paper and toner. •

Knight is a free-lance writer based in Chicago.

Imaging for everyone

CONTINUED FROM PAGE 83

plications through callable modules.

For example, you might invoke an imaging system through an API, through a Windows facility such as DDE or OLE (in Watermark's case) or simply by associating it with screen-display areas, as in the case of PaperClip Imaging Software, Inc. These products offer the full functionality of imaging without requiring extensive programming or integration.

Many packages use proprietary database engines to perform indexing and retrieval. That can create problems when migrating to a more advanced imaging system or trying to integrate imaging systems across the enterprise.

With both the first and second integration levels, the interface components of the imaging systems are relatively standardized. This can be a benefit to quick application development and user acceptance; but it can also present a problem for sophisticated applications or especially novice users who are not accustomed to a specific GUI environment.

That's where the third level of integration comes in: database integration. This is achieved through products that support industry-standard database engines and 4GLs, such as Oracle Corp., Sybase, Inc. and Borland International, Inc.'s dBase. For instance, Viewstar works with Gupta Technologies, Inc. and Sybase products, while LaserData works with Oracle databases.

The primary benefit of this approach is a highly customizable configuration and interfaces, integration capabilities with existing applications and programmable extensions such as work-flow routing modules.

Growing up the key

Ultimately, the myth and reality of imaging are flip sides of the same coin. The imaging myth is that simply adding imaging to your technology suite without considering business analysis and work process issues can reduce the cost of an imaging application.

The imaging reality is that low-cost products — along with easy availability, installation and use — do nothing to change the complexity of the underlying enterprise business problems. If you view imaging as an intricate part of the business processes, you are far more likely to make the right choices and achieve the goal of cost-effective imaging, regardless of the actual products you choose. •

reality check

Application: Catching money launderers.

Application requirements:
- Scanning and OCR.
- LAN-based operation.
- PC-based platform support.
- Minimal integration.
- Bundled text retrieval, OCR and compression/decompression.
- Client/server architecture.

Money laundering leaves behind a monumental paper trail. When a trial comes up, a task force of the Internal Revenue Service, Department of Justice and Drug Enforcement Agency has to sift through mountains of paper that include testimony, financial documents, deposit slips, check stubs and endorsements.

Recently, a pilot was undertaken to assess the viability of converting trial documents to an imaging system. The solution needed to be not only inexpensive but also easy to install and use.

The product chosen, Compulink Management Center, Inc.'s LaserFiche, was a PC-based solution that cost slightly more than $100,000 for a five-user license and included hardware, software and integration. (The high bid received by the same user for another integrated solution was almost $900,000 — of which $600,000 was the cost for integration services.)

Compulink's advantages were its compatibility with existing hardware and networks along with a virtual turnkey image applications interface. The system also included a full-text retrieval function that was automatically enabled for every document scanned in as an image.

The final system is intended to provide both the prosecuting and defending counsel with trial documents on optical disc, eliminating the task of copying and shipping original documents back and forth.

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Technology Analysis: Lotus Notes: Document Imaging 1.0 a robust bargain

Reviews	Ease of use	Performance	Document management features	Documentation	Compatibility	Media/Data import	Security	Technical support	Overall value
LAN Magazine 3/93	Great to work with	Robust	Logical	Excellent information use	A little troublesome	NC	NC	Can be difficult	This baby's right on time
PC Week 11/2/92	Easy to learn	Intelligently handles image files	Should be more transparent	NC	Especially useful	TIFFs and PCXs can be imported	Problems will crop up	Support contract must be purchased	Notes data distribution leveraged
Datamation 7/15/92	Making life a little easier	Saves time	A set of APIs	NC	Scanner-, fax-, gateway-compatible	NC	NC	NC	Uses of this product are extensive
Users									
Sally Jennings, Texaco Chemical Co.	Poor	Good	Poor	Good	Good	Poor	NC	Poor	It's fantastic for the price
Sarah Heany, Cabletron Systems, Inc.	Poor	Poor	NC	Good	Poor	Good	NC	Poor	It's proved invaluable
Jerry Dillotale, Cincinnati Bell Information Systems	Poor	Good	Poor	Good	Good	Good	Very good	Poor	Very enthusiastic about the product
Randy Eckel, Infoimaga, Inc.	Poor	Good	Good	Good	Poor	Poor	Poor	Good	Excellent value
Analysts									
Peter Kastner, Aberdeen Group	Very good	Good	Poor	Good	Very good	Good	Good	Very good	Good value
David Marshak, Patricia Seybold Group	Good	Very good	Poor	Good	Poor	Very good	Good	Very good	Good option within a Notes environment

Key: Very good, Good, Fair, Poor. Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment.

Lotus Development Corp.'s Lotus Notes: Document Imaging 1.0 is the first in a series of planned add-ons for the company's groupware Notes program. The offering targets Notes users who want to share and store document images with one another. Users can integrate images into word processing documents, electronic-mail messages and databases.

Ease of use: The reviewers said that although Lotus Notes: Document Imaging is challenging to set up; its pull-down menus and displays are convenient. Lotus' SmartIcons are used for speedy access to common functions and to simultaneously open several documents.

Document management: The product enables images to be used in Notes documents by linking and embedding. Linking uses the Mass Storage System to determine the location where the image files are temporarily placed. With embedding, an embedded image file in a Notes document transports the document for replication to all other Notes servers on the corporate local- or wide-area network.

PC Week reported that the product's use of Dynamic Data Exchange and Object Linking and Embedding is a bit more complicated than the typical Edit/Copy and Edit/Paste commands found in most Microsoft Corp. Windows-based programs with the same features. Users need to put the cursor in the Notes document on the spot where they want the image to be placed. Next, the Document Imaging editing software has to be opened and then either Link or Embed must be chosen from the menus.

Compatibility: Lotus Notes: Document Imaging spontaneously migrates files from the temporary storage area of the Mass Storage System to another location whenever the temporary storage nears capacity. A variety of storage media, including hard drives, jukeboxes, network drives and optical discs, is supported.

Media/Data import: The product can import and export both Tag Image File Format and PCX format files.

Security: *PC Week* reported that Lotus Notes: Document Imaging is missing a few important features — namely, the ability to protect images from annotation by unauthorized users.

According to *PC Week*, security problems will crop up because users can edit linked images in a Notes document even when they have read-only access.

Technical support: Support is provided Monday through Friday, 8 a.m. to 8 p.m. EST. However, a support contract must be purchased for technical support.

Overall value: At $295 per user, Lotus Notes: Document Imaging is a bargain. Reviewers said the product is robust enough to tackle the demanding imaging needs of the corporate paper trail, offering a diverse set of features including the Object Monitoring utility and the Mass Storage System utility that run on the server to track and manage images.

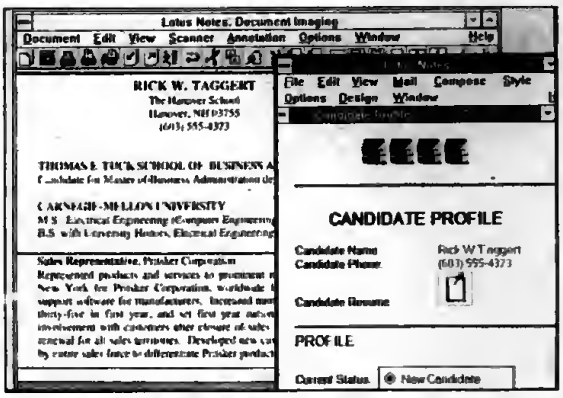
Summary by Lisa Davidson.

LOTUS RESPONDS

Mike Mitsock, senior product marketing manager:

Document management: The scanner can be used a couple of ways. It can be set up as a shared scanner with walk-up access — sort of like a copy machine. Our Object Linking and Embedding method is more akin to what we call embedding an image. Since linking is involved, it is not just a desktop phenomenon but could also be a group or enterprise phenomenon. While it could appear clumsy to some, it is not just an issue of scanning into an individual document. A shared database imposes other issues.

Security: That is something that we want to fix in the next release, which is not too far off.



Lotus' Lotus Notes: Document Imaging 1.0 *enables images to be used in Notes documents by linking and embedding*

Vendor financial ratings

Analysts	Long-term stability	Short-term performance
Steven Frankel, Adams Harkness and Hill, Inc.	Good	Good
James Meyer, Janney Montgomery Scott, Inc.	Poor	Poor

Lotus' net income rose 87% to $80.4 million for the year ended Dec. 31, 1992, from $43.1 million in 1991. Revenue for 1992 grew 9% to $900.1 million from $828.9 in 1991.

Buyers' Scorecard: Proprietary systems still have their advantages

By Derek Slater

Sales of PC and local-area network imaging software are on the rise. However, users surveyed in the Buyers' Scorecard satisfaction poll indicated that these low-end and midtier solutions have a lot of work to do to match the functionality and ease of use of traditional packages. (For a listing and description of both types, see page 82.)

The traditional high-end systems — Wang Laboratories, Inc.'s WIIS, FileNet Corp.'s Workflo and IBM's ImagePlus — are also referred to as production systems, in contrast to what International Data Corp. analyst Scott McCready calls "ad-hoc" systems.

Respondents using the low-end and midtier systems indicated that they spend less than half of their work time using imaging functions, hence the ad-hoc moniker. Production system users tend to use their imaging applications full-time.

Roughly 50% of the ad-hoc system users said their products are capable of handling mission-critical applications. These packages earned satisfaction marks roughly comparable to the high-end products in performance. Two key areas in which the ad-hoc systems earned much lower grades were service and support and ease of use.

Management issues

Users indicated that traditional systems also offer much more work-flow management functionality, but low-end users said that area was relatively unimportant for their needs.

Despite the dominance of the high-end systems in user satisfaction, the growth of shrink-wrapped imaging software sales indicates that the imaging market is following the general trend toward PC and open systems solutions.

The traditional imaging vendors are moving to counter the momentum of the ad-hoc systems by increasing support for smaller platforms and by offering greater connectivity to other vendors' hardware.

Wang's OpenImage series, for example, runs the company's imaging software on relabeled IBM RISC System/6000 servers.

Wang also recently announced it will port the software to Hewlett-Packard Co. workstations, which Wang will resell under the HP label. Client PCs running Wang's applications (which can also connect to mainframe hosts) use a Microsoft Corp. Windows front end. FileNet has also released Workflo for Windows.

"The traditional market is becoming a software category because people don't want the proprietary hardware. The value added by the hardware supplier is minimal," according to McCready. (See next page for more about the traditional vendors' strategic directions.)

The move away from expensive proprietary hardware is borne out by patterns in the market's growth. According to preliminary figures from market research firm Dataquest, Inc., the number of commercial imaging systems shipped in 1992 totaled more than 7,700, up 60% from 4,868 in 1991.

Revenue rose much more slowly. Revenue of $2 billion was generated, up only 11%, compared with $1.78 billion in 1991 revenue.

A poll of information systems managers conducted by CSC Index, Inc. also ranked imaging as the No. 2 emerging technology for 1993. Of the survey's 407 respondents, 29% mentioned imaging as the key technology, ranking it behind client/server computing's 47%. (Multiple responses were allowed.) Imaging finished first in the poll in 1992.

Diverse respondent base

The survey respondents were drawn from a wide range of industries: Roughly 30% were from government agencies; the other traditionally paper-intensive banking, insurance and financial services industries accounted for another 30%; the remaining respondents came from the transportation, health care and consumer goods industries.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned 1-to-10 ratings based on their satisfaction with their imaging systems in specific product categories.

All categories were factored into the final scores. The scores for each high-end product in the six most important categories are listed in the tables on the next page.

Old guard, new guard

Low-end and midtier packages outscored traditional production imaging systems in user satisfaction with cost per seat but trailed behind in other key areas

	High end	Midtier and low end
[illegible]	8.2	6.6
[illegible]	7.6	7.5
[illegible]	7.9	6.8
[illegible]	6.3	6.6
Scalability	7.6	6.8
Work-flow management features	7.7	6.2

Response base: High-end, 97 users. Low-end and midtier, 30 users.

(High-end products include Wang, FileNet and IBM. The response base for low-end and midtier products includes users of LaserData, Westbrook and similar vendors. Scores represent the average of all users' responses within the product category.)

Staying put

Users who have already installed integrated systems are staying put

Q. Are you planning to move your imaging applications to a smaller platform?

	Yes	No	Don't know
Wang WIIS	6	20	1
Filenet Workflo	7	32	0
[illegible]	3	26	2

Living up

In general, users of production systems said their products have delivered as expected

Q. Does your imaging system provide the cost savings or productivity increase you expected when you bought it?

	Yes	No	Don't know
Wang WIIS	26	0	1
Filenet Workflo	30	7	2
[illegible]	24	6	1

METHODOLOGY

User names were obtained from a combination of vendor and nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey and tabulated the results. The response base was 39 users for FileNet, 31 for IBM and 27 for Wang.

Thirty users rated their low-end and midtier products. The respondents rated individual products; scores for these products were arranged to derive the ratings for the entire group in the chart above.

The performance score for the traditional systems is the result of two distinct criteria: transaction throughput and image-retrieval speed.

To compute the overall score for each of the traditional products, perform the following steps: 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all remaining categories. 3) Average the resulting figures for the average weighted score. 4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance rating is equal to the ratio of the overall score to 10. Numbers are rounded off where necessary.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and firms for their assistance with this Buyers' Scorecard: *Computerworld* Database Division; Scott McCready, International Data Corp.; Mary Bamford, BIS Strategic Decisions; Association for Information and Image Management.

High-end systems

User demands force old-guard changes

By Tom Koulopoulos

The founders of imaging are undergoing profound changes in their product offerings, especially as the imaging market shifts from a pioneering effort requiring vendors to convince users of its viability to a freewheeling competitive field driven by user demands.

Major vendors such as IBM, Wang Laboratories, Inc. and FileNet Corp. have spent untold millions in the past five years trying to prime the pump of industry and government by creating an awareness of benefits and payback.

They were so successful in their promotions that users are now demanding image processing products. But users want low-cost entry-level solutions, not the expensive proprietary systems once sold by the pioneers.

Indications are that these vendors are more than capable of providing competitively positioned solutions, if needed. For example, an entry-level system can be purchased for less than $10,000 per seat, compared with more than $20,000 per seat two years ago. "For many users, price has been an obstacle," says Gordon Libert, vice president of marketing at FileNet.

The traditional vendors are shifting their emphasis from a single, all-purpose hardware or software solution to that of adding value through the process of integration and services. IBM, for one, has staked out a position by emphasizing how much it costs to customize the emerging low-cost hardware and software systems to individual business requirements. "The real question," according to David Liddel, IBM brand strategy manager for image solutions, "is not how much will it cost to customize, but rather do you want to buy experience from a third party and put the cost on your books, or are you going to absorb the cost with your resources?" Either way there will be an additional cost.

With this in mind, the major imaging vendors are emphasizing the need for planning and integration.

The impact can't be underestimated. Traditional vendors, such as Digital Equipment Corp., already recommend other hardware platforms and non-DEC solutions to customers. Italian computer giant Ing. C. Olivetti & Co. derives more than 60% of its revenue from service-related activities.

Following this strategy, Wang expects service revenue and margins to increase as hardware and software revenue falls. "Someone will grab the commodity software market [for imaging]," says Ron Arenson, director of image marketing at Wang.

Wang recently decided to discontinue hardware manufacturing operations and focus strictly on services and software.

This shift among the traditional vendors means the market for low-end imaging systems for small workgroups and commodity imaging will belong to some other player. That vendor will not likely be an organization that concentrates on services and integration.

Another result of the shift is a heightened push for open systems and document standards that encourage interoperability of imaging systems. This is necessary for a true commodity solution at the low end to emerge.

The process of selecting an integrator will certainly become much more interesting because virtually all major hardware vendors will be in the running. •

reality check

Application: Regulatory compliance.

Application requirements:
- Fast remote access to images and documents.
- Little training for end users.
- Minimal initial investment.
- Retrieval based on "fuzzy" criteria.

Since the chemical disaster in Bhopal, India, the chemical industry, the Environmental Protection Agency and the Occupational Safety and Health Administration (OSHA) have upped their emphasis on safety and information relating to hazardous materials.

Much of this information is contained in vast repositories of engineering drawings, plant maps, Materials Safety Data Sheets (MSDS) and myriad regulatory guidelines. Access to this information has historically been through a number of interfaces, including paper, blueprints, regulatory guides and updates, company memoranda, maintenance logs and a variety of on-line databases.

OSHA has put pressure on organizations to put all documents and data in electronic form to provide immediate access to critical information. The problem: Previously separate systems must be integrated into a single document management system.

Few products can meet such a broad range of demands. Organizations have had to turn to integrators to develop a system.

One user of a novel, cost-effective approach is Lockheed Advanced Development Co. Lockheed chose Excalibur Technologies Corp., which provides an integrated imaging, optical character recognition and full text-retrieval package for DEC VAX and PC workstations. The novelty of Lockheed's approach is a dial-in and fax-back capability that allows remote access to all documents stored on a central image server. Field personnel can dial into the imaging system using a standard Touch-Tone phone and request that an MSDS be faxed to them at a number they specify.

Vital statistics

What is your responsibility for imaging software?

Evaluate or recommend vendors	97
Determine need	88
Select vendors	83
Set standards for your organization	79

RESPONSE BASE: 127 USERS (MULTIPLE RESPONSES ALLOWED)

Ratings are based on a 1-to-10 scale, where 10 is best.

Reasons are based on the most frequently stated answers.

Wang's WIIS

OVERALL SCORE 77

8.8	Reliability
8.7	Sufficient capacity
8.6	Ease of use
8.3	Responsiveness of vendor service
8.1	Quality of technical support
7.8	Transaction throughput

Would you buy the program again?

LIKELY REASON: Good performance (19)

UNLIKELY REASON: Vendor's financial problems (8)

RESPONSE BASE: 27 USERS

FileNet's Workflo

OVERALL SCORE 75

8.7	Sufficient capacity
8.3	Reliability
8.2	Responsiveness of vendor service
8.2	Quality of technical support
7.3	Ease of use
7.3	Transaction throughput

Would you buy the program again?

LIKELY REASON: Good product (34)

UNLIKELY REASON: Better products available (5)

RESPONSE BASE: 39 USERS

IBM's ImagePlus

OVERALL SCORE 72

8.3	Reliability
8.2	Responsiveness of vendor service
7.6	Quality of technical support
7.6	Sufficient capacity
7.6	Transaction throughput
7.3	Ease of use

Would you buy the program again?

LIKELY REASON: Easy to operate (27)

UNLIKELY REASON: Better products available (4)

RESPONSE BASE: 31 USERS

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The entire community seems to want tickets to this year's NeXTWORLD Expo, and no wonder. Our Second Annual Expo kicks off May 25 with the most important event in NeXT's history. The release of the shrink-wrapped NeXTSTEP software for Intel processors. It's a don't-miss-it opportunity to experience object-oriented computing, and what's been called "the most respected piece of software on the planet,"* on industry-standard computers. **STEVE JOBS AND ANDY GROVE, KEYNOTES.** Besides seeing the release, you'll also be given insight into it by the two people best equipped to talk about it—NeXT Chairman Steve Jobs, and Intel Chairman Andy Grove. They'll give the two keynote speeches. **THREE EVENTS IN ONE.** In addition to the all-important product release, the Expo consists of a Worldwide Developer's Conference featuring numerous industry luminaries; the annual User Conference and User Group Program; and a Product Exposition with over 100 exhibitors. All are key events for the object-oriented computing community. **$2500 DEVELOPER DISCOUNT.** Two major discounts give you added incentive to attend. If you attend the Developer Conference, you're eligible for a special bundle. For $300** and your $695 Admission Fee, you'll get not just admission, but a copy of NeXTSTEP for Intel Processors User Environment and NeXTSTEP Developer. Register now as space is limited. **50% SOFTWARE DISCOUNT.** In addition, everyone attending any part of the Expo will be eligible for a 50% discount on the purchase of NeXTSTEP software products. **CALL NOW.** For information or to register, call 1(800) 767-2336 today. But whatever you do, be sure you've got a ticket.

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A0ZTWC

Why business managers are empty-handed

By David Vaskevitch

Do managers **really spend most of their time processing words, building spreadsheets and maintaining simple databases? That's what you'd think, looking at today's software sales and the primary efforts of the PC software industry.**

The dominant software categories are word processors, spreadsheets and databases, which account for 75% of the world's PC software purchasing dollars. The next tier of applications includes presentation graphics, project management and electronic mail.

But word processors never found their way into the hearts and minds of managers. Spreadsheets can be liberating for budget-building, but most managers spend little time calculating numbers other than at budget time. And while database software is quite powerful, it can also be quite complex.

In reality, most managers use their PCs for only a fraction of the day, instead preferring copiers, fax machines, telephones, filing cabinets, secretaries and personal interaction.

In fact, while the PC is supposed to represent an electronic desk, it doesn't even come close to replacing the piece of furniture on which the machine sits. That's because today's PC software doesn't fit in with what today's managers really do.

> SPREADSHEETS ARE FINE; WORD PROCESSORS ARE GREAT. BUT AT LEAST 90% OF BUSINESS MANAGERS' TIME IS SPENT DOING OTHER THINGS — TASKS NOT SUPPORTED BY AVAILABLE SOFTWARE. ISN'T IT TIME WE STARTED PUSHING FOR SOFTWARE THAT INFLUENCES THE WAY MANAGERS WORK?

During the '90s, the software industry has to gain a clearer picture of how managers work so it can deliver useful tools.

Managers tend to work through others instead of accomplishing tasks themselves. Rather than being generators of words and numbers, managers focus primarily on the three C's: communication, control and coordination.

The computer, particularly in a networked form, can help managers concentrate on communication, control and coordination, but only if new categories of software, as described in the following pages, emerge.

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A new generation of applications that will finally support a manager's everyday tasks of communication, control and coordination will make its appearance before the decade is out. With a new set of software (described on these pages), the PC could become a tool managers use all day, every day. These machines will become — finally — a central part of every manager's job.

Communicate

Managers probably spend most of their time communicating. As new PC software becomes available that more directly supports this activity, the managerial workstation will become indispensable.

Today, most managers would hardly notice if the PC on their desks were taken away — except at budget time or while writing a key memo. However, in companies with active electronic-mail systems, managers notice and complain within minutes if the mail system or their PC stops working.

E-mail, in its ability to improve the informal communications process, is the first tool to change the underlying patterns that are implicit in a manager's everyday working life.

Communication manager

E-mail takes care of person-to-person interaction; bulletin boards (like Lotus Notes) do their part for groups. If you combined those functions and added some others, such as the ability to link all communications that emanate from the manager's desk through hypertext, you'd be on the road to a communication system fit for a manager.

Yet in many ways, E-mail addresses only a small part of the real need. For one thing, most E-mail systems don't remember any history. In addition, they are limited in scope, best suited for directed communications among either individuals or small groups of people.

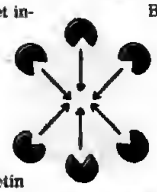
Other types of communications software, namely bulletin board systems, markup packages and multiuser hypertext systems, start to address the rest of the need.

Bulletin board systems were specifically designed to remember lots of history, and they facilitate communication among medium and large groups of communicators. The system is organized around topics — that is, any subject a group of people is interested in discussing. Every message sent through a bulletin board is typically kept for subsequent display by all other interested users.

With a bulletin board system, a manager can confront an issue, come up to speed quickly, bring his longer term perspective to bear and make a decision that enables a deadlocked team to start making progress again.

A bulletin board system facilitates this process in three ways:

- The manager can stay on top of active topics by skimming the structure of the bulletin board to decide where he most needs to get involved.
- Once he has decided that an issue requires his involvement, the manager can quickly come up to speed on the context and background.
- Before making a decision, the manager can poll the team and others for additional input. The bulletin board provides both a mechanism for everyone involved in the decision to be equally up to speed and for contributors to add their input quickly, facilitating a rapid decision.



If bulletin boards are so useful, why aren't they more popular in the managerial community and among corporations in general? Part of the reason is that until recently, this technology did not really exist in a form that corporations could use internally. Lotus Development Corp.'s Notes is probably the first large-scale commercial product that is bringing bulletin board technology to commercial organizations.

But E-mail and bulletin boards are just the beginning. Waiting in the wings is an approach to communicating based on E-mail and bulletin boards that goes beyond those technologies.

To understand this communications environment, you need to understand the concept of multiuser hypertext. Whenever someone writes text, such as a memo, a story, a letter or a piece of E-mail, the author is taking a complex web of concepts and thoughts and reducing it to a linear, sentence-based form. Hypertext, on the other hand, enables users to store the original, nonlinear web of concepts directly in the computer.

Because the hypertext system maintains all the relationships between concepts, it is possible to jump from one concept to another.

Today, when a PC user communicates, he is forced to save his communication in one of three places: the traditional file system on his hard disk and network, his E-mail system or a bulletin board repository. Each of these meets a particular need, but they do not tie together very well.

Suppose you could replace all three with a single, organizationwide — or even worldwide — multiuser hypertext system?

In this new world, each time a manager communicates, what he writes would be stored in a universal shared information space. Each communication could be linked to all related communications.

Eventually, this system — in essence a synthesis of E-mail and bulletin board concepts — would be so powerful and ubiquitous that it could replace the current concept of a file system and become the underpinning of a PC-based information environment.

The file system is transformed from a passive, storage-based repository to an active communications environment that is visible to the user on a constant basis.

E-mail's role

E-mail is one of the existing technologies that has helped interest managers in PCs. In an extensive E-mail implementation in one military organization, the following occurred:

Patterns of communication changed. Formerly, almost all conversation was vertical between adjacent levels in the chain of command. With E-mail, users felt free to send mail to anyone else on the system.

Decisions were made more quickly, and more people knew about decisions after they were made.

The volume of formal memos and telephone calls each decreased by at least a factor of four.

Control

To be in control, a manager must be on top of his numbers; managers are expected to produce solid budgets and forecasts. Today's software not only falls short of supporting budget and forecasting needs, but it also fails to facilitate information access so managers can determine whether operations are on target.

You'd think budgeting and forecasting are well-served by existing tools, particularly the spreadsheet. Well, yes and no. Of course, the spreadsheet has become the primary tool used to develop budgets and forecasts, and, of course, it has simplified life tremendously compared with calculators. Yet the spreadsheet ignores two key components of budgeting: mathematical forecasting and data collection across the organization.

The standard spreadsheet leaves forecast model building, for instance, entirely up to the user. Because most people are notoriously bad at developing accurate forecasts, most business plans are based on some form of simple linear growth.

What managers need is access to some form of modeling tool that provides more sophisticated forecasting capabilities, along with built-in expert assistance in how to use them.

As for collecting data across the organization, spreadsheets again come up lacking. Most large organizations collect budget data from individuals and departments to get a corporatewide picture. Changes are then compared with overall profit targets, and managers are asked to redo their budgets. This process is repeated again and again.

The single-user spreadsheet tools available today cannot support this process. While limited facilities are provided for one spreadsheet to reference another, no spreadsheet available today has any understanding of how organizations are structured and how data is consolidated and controlled on an ongoing basis.

Budgeting is a hierarchical operation; managers need better tools for consolidating numbers across teams and departments, monitoring expenses and investigating anomalies.

It is not hard to imagine a budgeting and control tool that would solve both of the problems described above. The system would start with an understanding of the organization's structure. It would also contain basic forecasting facilities, including a model for seasonal trends by product line as well as the company's master assumption about growth in the quarters ahead.

Individual managers would be able to use the system much as they use a spreadsheet today — in fact, the spreadsheet might be the basic mechanism for accessing the system. However, the underly-

Continued on next page

Continued from previous page

ing support structure would make all budgets and forecasts automatically part of the larger structure of organizationwide numbers without any need for copying spreadsheets or sending disks around by mail.

Such a system is not currently available. If it were, it would likely take the form of a spreadsheet front end to a database-oriented budgeting and accounting system.

Beyond sophisticated budget and forecasting, managers need to determine how their operations are doing against budget. Today — 30 years after the introduction of the first computerized accounting systems — most managers have a hard time accessing that kind of performance information.

Understanding expenses often requires accessing more than accounting information; the manager must go back to the original memos, plans, proposals and status reports describing the project.

In theory, if this information is computer-based, it should be easy to find. Unfortunately, that's not the case.

Searching through multiple directories across several servers on a network is only slightly more likely to result in a retrieval than looking through file cabinets.

What managers need is a fast, friendly way of finding documents when they need them. This is an area that has received much attention during the last 20 years, yet the basic filing system most companies use continues to be based on DOS and its eight-character file names.

The kind of filing system managers need to make information access easier should have the following characteristics:

- Foldering facilities that enable documents to be filed in multiple places.
- Cross-document linking so that any document can refer to any number of other documents.
- Content-based retrieval so that documents can be located based on key words and phrases found anywhere in the text.
- Automatic archival both to migrate unused documents off the network and to bring these documents back.

Today, the only way to get the kind of filing system described here is to sweat through building it from scratch with third-party tools. Eventually, however, these types of facilities will likely become a basic part of operating systems.•

Budget manager

Spreadsheets are good for budgeting, but they could be better. Budgeting is a hierarchical process, but spreadsheets can't collect data across an organization. They do not help with forecasting either, which no one does well. Budgeting also requires immediate and flexible access to lots of data. Put all of that together in a system, and you've got a budget/forecasting system for a manager.

Improved search

Filing systems on networks need to enable managers to find documents quickly and easily, no matter where they are. Many people assume that content-based information retrieval solves all problems — but that is far from the case. Retrieving documents primarily by keyword searches is expensive (in both time and space) and not very accurate. Most users have trouble picking just the right set of keywords. Therefore, other facilities, particularly those based on foldering and linking, become important.

Coordinate

Coordinating the activities of a team is a time-consuming activity for most managers. This task largely involves goal-setting, schedule-setting and attending regular meetings to keep in sync with the team.

Superficially, project management software and personal information managers appear to address many of these coordination needs. Yet even managers who depend on project management software tend to view it as a highly formal mechanism that they use only on the largest projects rather than as a vehicle for routine team coordination. Project software isn't suited for the kind of goal-setting important to the team environment.

Personal information managers, for their part, can establish and track goals and create to-do lists as well as coordinate multiple calendars to simplify meeting scheduling. But most are limited in a team setting, unable to manage the calendars of any group larger than about five to 10 people.

What business managers need is a combination of project manager and personal information manager features to yield what might be called a "team coordination system."

Such a system would include the following functions:

- **Goal manager:** *A shared forum to agree on goals, including unscheduled future objectives.*

How often have you thought of a future project that your team has no time for now and wondered how to keep track of that goal so it can be reconsidered periodically for eventual implementation? How about being able to see how all the goals for several groups, all part of a larger department, fit together?

A goal management system would deal with these kinds of problems, enabling goals set during an annual performance review to be reflected in quarterly, monthly and weekly objectives. The goal manager would enable a manager to see high-level objectives for himself, his managers and his team. He would be able to drill down to uncover the underlying details associated with accomplishing particular objectives within certain time frames.

Goal managers would be for team use. The software would provide a framework for group planning meetings, allowing the group to see high-level long-term goals or zero in on a particular area to plan a specific project.

Best of all, the system would provide a shared structure for all managers so they can share goals and coordinate activities.

- **Progress manager:** *A tracking mechanism for the timelines (strict and otherwise) associated with projects and goals.*

While the goal manager deals with the highest level planning and coordinating, a progress manager deals with the next level down. It tracks progress against objectives for a manager and his team.

Progress management software ensures that goals and schedules are in sync, it has no fixed beginning or ending date and it produces a fluid schedule that consists of multiple, unrelated activity networks. Goals, projects and tasks don't have to be part of a larger project.

Finally, progress management software has different types of output that are both simple and easy to annotate.

- **Schedule manager:** *A more detailed framework for sharing schedule information, including travel, meetings and activities related to goals.*

The final component of the team coordination system is a schedule manager. This component would include all the standard facilities of schedule, calendar and diary management, from scheduling meetings to keeping up on team travel and what project everyone is working on.

To make it all work, the system would have to exhibit some of these key characteristics:

- Fast and easy to use.
- Robust. Because calendar information, particularly for groups, is critical, it can't be lost. So a schedule manager would need the type of the integrity features found in transaction database systems.
- High throughput. Because the schedule manager has the potential for heavy use, it should be based on a highly distributed, scalable technology.

For large organizations, for instance, systems based on simple sharing of DOS files on a server would quickly run into critical performance limitations.

Some organizations have started to implement their own team coordination systems. One large government department, faced with a software project that will take eight years and involve thousands of programmers, is writing specifications for a comprehensive system. However, some companies can't afford the build-it-yourself approach.

In time, packaged software should emerge that marries personal information managers with the functionality in project management programs.•

Just Gantt help it

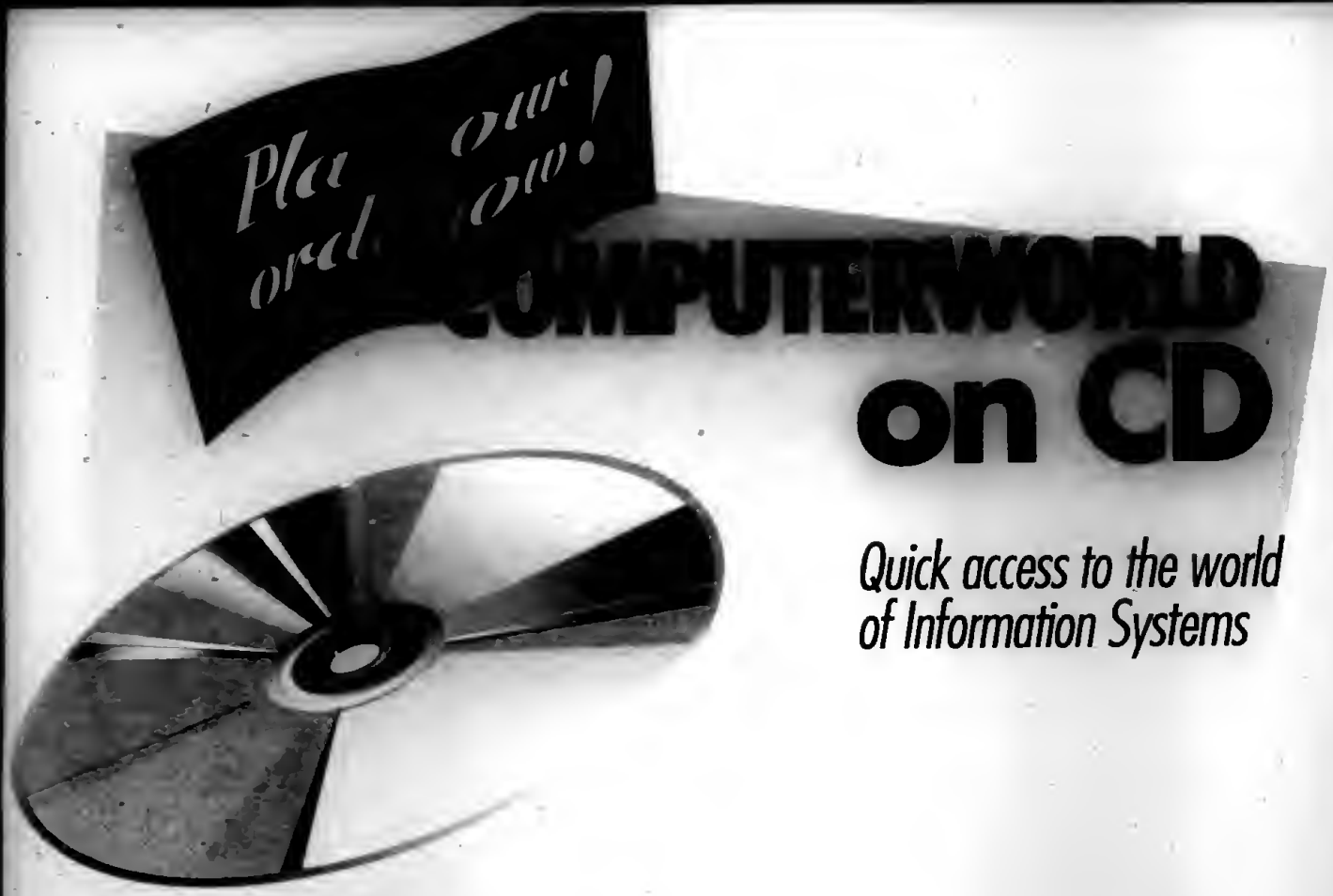
The progress manager portion of the team coordination system needs to produce simplified reports updating everyone on whether a team is meeting objectives. Two report types will be useful:

- **Calendar Gantt:** A monthly calendar view, with Gantt lines for key projects and goals superimposed.
- **Linked Gantt:** A classical Gantt chart, with lines to show dependencies between tasks.

Team coordination system

Personal information managers would work well here, except that they're not intended for large groups. Project managers are too formal. But if you took elements of those systems, added coordination facilities, allowed for multiple views of the data and vague deadlines, you'd have a coordination system right for a manager.

Vaskevitch is director of enterprise computing at Microsoft Corp. in Redmond, Wash.



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Computer Careers

Getting the GOOD GOOP on OOP

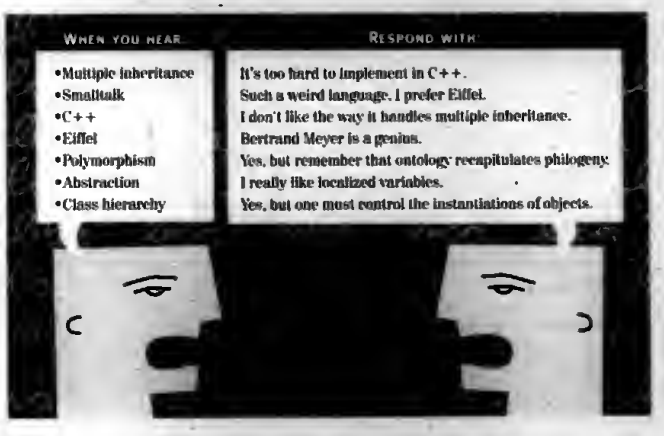
By Don Burleson

EVEN IN TODAY'S tight job market, programmers with object-oriented skills find themselves in high demand, bombarded with offers for prestigious and highly paid positions. Object-oriented programmers command some of the best jobs in the industry, and their career opportunities are bright.

But how does a programmer become versed in object orientation? There are no certification programs for object-oriented skills and no "OO" degrees.

When object-oriented programming first became the industry fad, there was a rush to understand this complex approach to systems development. When I attempted to become knowledgeable about it, I was confounded by abstract languages such as Eiffel, Smalltalk and C++. Even more confusing was the large array of object-oriented acronyms. I knew there had to be an easier way.

Rather than spending hundreds of hours actually learning object-oriented programming, I discovered it was far easier to memorize all the words and acronyms associated with the technology.



I've collected all this information into a manual of Global Object-Oriented Double-talk (GOOD) and General Object-Oriented Phrases (GOOP). By using these terms generously in conversation, you will impress your colleagues with your in-depth knowledge of GOOD GOOP.

Object-oriented societies are a good source of acronyms. You must be well-versed in these to impress co-workers with your object-oriented knowledge.

There is the Systems Conference on Object-Oriented Programming (SCOOP), the Object-Oriented Programming Systems Languages Association (OOPSLA), the Principles of Object-Oriented Programming Association (POOPA), the European Conference on Object-Oriented Programming (ECOOP) and the Symposium on Object-Oriented Programming and Analysis (SOOPA).

These organizations pool their membership for joint conferences such as the popular OOPSLA-ECOOP conference in Phoenix. There are rumors that a mega-conference is planned for next summer in New York. The name? POOPA-SCOOP.

To be regarded as an expert in object-oriented programming, you must first know the Principles of Object-Oriented Programming (POOP). After mastering POOP, you can move on to the most sensuous of the acronyms, Object-Oriented Analysis (OOA), pronounced "Oooob-Aaaah."

Now that you get the idea, you can confound your associates by creating your own object-oriented acronyms. Your colleagues will be impressed that you are keeping up with the latest developments.

Here is my collection:

- FOOL: Fouled-up Object-Oriented Language.
- OOLALA: Object-Oriented Lexical Algorithm Language Application.
- DROOL: Database-Related Object-Oriented Language.
- HOOPLA: Heuristic Object-Oriented Programming Language Algorithms.

The possibilities are endless. With a little creativity, you can create an object-oriented acronym for any career situation.

Burleson is a database administrator at Thomson Professional Publishing Information Technology in Webster, N.Y.

What's it really like out there? Look around you. What are typical co-workers like? How are IS department meetings really run? DOES THE GRASS LOOK GREENER FROM SOMEONE ELSE'S DESK? IS THERE MORE TO A JOB IN THE IS SHOP THAN MEETS THE EYE? SEND YOUR OBSERVATIONS — SERIOUS OR OFFBEAT, BUT ALWAYS CANDID — TO KELLY E. SEWELL, ASSISTANT EDITOR, FEATURES.

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Overnight delivery industry

Packaging your skills for express delivery

By Joe Panepinto

THE CRITICAL QUESTION for most express delivery companies is finding the shortest distance between two points on the globe. Unfortunately, the answer isn't always a straight line. For instance, moving goods from a tennis shoe manufacturer in South Korea to a wholesale distributor in St. Paul, Minn., might involve a complicated network of air, sea and land transport. Unexpected disasters might mean figuring out a whole new — and nonlinear — route for getting a product quickly from point A to point B.

Information systems career opportunities in overnight delivery industries run the gamut from systems analysts to network specialists and application developers. In spite of the recession, the industry is growing. Overnight service is so critical to business needs that companies haven't been cutting back, hiring managers say.

Opportunities exist in a variety of areas — technical support (help desk), development and operations. And the pay is competitive. IS professionals with three to five years' experience can expect to earn $30,000 but can command up to $60,000 per year with rare skill sets.

Never a dull moment

A word of warning: This industry is not for the staid or meek-at-heart. The byword for IS personnel in express delivery, especially for those in operations, is: "Expect the unexpected."

John Ricker, vice president of corporate systems development at Federal Express Corp.'s Memphis headquarters, likens the operations side of the industry to a large-scale military command-and-control operation.

"Our command-and-control system is a real-time, end-to-end asset management system that optimizes and schedules trucks, airplanes and people," Ricker says.

Although most large-scale systems developed and supported by overnight courier companies are mainframe-based — Fedex's Cosmos Network and Air Express International (AEI)'s Logis System, for instance — there is a movement toward smaller Unix and client/server systems. The price/performance of Unix systems has improved, and the cost of maintenance is lower than it is for mainframes.

At the same time, object-oriented skills are very much in demand as companies look for ways to reduce development cycle time and increase the reusability of code. Because of the nature of the business, there is little patience for slipped development deadlines.

Stand and deliver

"We work in a very fast-paced environment," says Cynthia Smith, vice president of information services at Danzas Corp. in Bellevue, Wash. "Our internal clients think if they can get a 500-pound box from here to the other side of the world overnight, we should be able to build applications in short order."

While the majority of development job opportunities in this industry are centered around the major data centers, there are also opportunities at scattered field sites for operations and support personnel. The challenges on the operations and system support side are much different from those on the development side.

IS personnel in operations have to deal with rerouting and rescheduling shipments around all sorts of natural disasters; system support personnel face equally daunting challenges of keeping the system up at all times.

When Hurricane Andrew struck in Florida, Smith had to track down a backup generator in Atlanta that could be shipped to Miami to ensure the local system stayed up. In the express business, disaster recovery and contingency planning experience is a plus.

Other challenges for IS personnel depend on the nature of the organization. For example, Fedex owns 450 airplanes and therefore has to develop extensive scheduling and flight plans. IS builds applications for airplane handling and scheduling, similar to what ticket agents and traffic controllers use to track arrival and departure times.

AEI in Darien, Conn., has to manage contracts with 28 airlines worldwide. In this situation, IS creates applications that tie right into commercial airline schedules using electronic data interchange (EDI).

Wanted: EDI personnel

The desire for EDI personnel is part of a larger push toward greater interconnectivity with client companies. Many overnight delivery companies have developed proprietary PC-based systems for use at client sites.

For example, the United Parcel Service, Inc.'s (UPS) Maxi-Ship system consists of a PC, UPS-developed EDI software and a printer. The system enables the user to produce all shipping documentation and manage all cost accounting on-site. Other companies, such as Fedex, offer similar services.

To provide these services to their customers, these companies need IS professionals with experience developing in C, C++ and Unix. Networking skills are also essential because these companies are constantly adding new client sites to the network.

"The real difference in this industry has been the development of value-added information technology systems," says Glen Holmstrom, human resources manager for information services at UPS, referring to UPS' custom-built systems.

Panepinto is a free-lance writer in Amherst, Mass.

Where the jobs are

Opportunities in overnight delivery revolve around each company's data center locations: **Fedex:** Memphis, Colorado Springs, Los Angeles. **UPS:** Mahwah, N.J. **Danzas:** Bellevue, Wash. **U.S. Postal Service:** Washington, D.C.; San Mateo, Calif.; Minneapolis; Wilkes Barre, Pa.; Raleigh, N.C.; St. Louis; New York. **AEI:** Darien, Conn. **DHL Corp.:** Redwood City, Calif.; Houston.

Money talks

IS pros with three to five years' experience and a rare mix of skills can earn $30K to $60K: object-oriented Unix programmers with industry knowledge.

Unix, EDI hot

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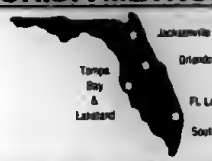

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Cutting repair costs

A PC technician's advice: Do some legwork before you call

By Todd Henschell

MOST FIRMS can reduce PC repair bills by abiding by a very simple rule: Preparation is everything. Any information you can gather before a technician arrives — no matter how insignificant — can reduce the time the technician spends on-site. Because you're probably paying between $80 and $200 an hour (and considering that most services bill in 15-minute increments), costs can really add up. Here are a few things that can cut time off service calls.

If the PC is still operational, the first step is to systematically replicate the error. Reboot and take detailed notes of everything you do before the problem occurs again. If the error repeats only under certain conditions, note what's different. For instance, maybe your word processor won't load a letter written yesterday but will load one written today.

Get the exact wording of every error message; it's more useful to say "Lotus 1-2-3 won't load and DOS says, 'Packed File Corrupt,'" than the user "got some message."

Next, make a plain DOS boot disk. If the machine will at least boot normally when using a "raw" configuration, you have narrowed down the search.

If you've booted with that disk and are running "plain DOS" and can't use the software or hardware on the local disk that was causing problems, tell the technician the error doesn't happen when you run the system without the usual boot-up configuration.

For large multiuser systems and networks, one of the best ways to track a difficult glitch is to see if anyone else is experiencing a similar problem. This tells the technician that there is a conflict with something in your system configuration files. This information may take 15 minutes off the service call.

How can you find out which it is and speed the repair? Just as you would on a stand-alone machine: Test a "control" system that's connected to the network by running the same sequence of software that led to the failure of the first system. If a different piece of hardware shows identical symptoms, you can bet your local system isn't to blame.

When a PC fails completely, you may not be able to gather much data. When this happens, write down what you were doing before the failure and the state the PC is in.

Although it may be safe, don't use a PC that is exhibiting unusual behavior. You risk the data's integrity and damage to other files.

If you experience a partial drive failure, talk to your technician before powering down. The drive contents may be salvageable by copying them to floppy disks. In general, with everything except a minor hard disk failure, your best bet is to power down and keep a boot disk handy. If you're struck with a virus — or think you are — be sure to write-protect your boot disk prior to using it.

Henschell is a PC consultant and freelance writer based in Burbank, Calif.

Savings tips

- If the problem is network-related, be sure the technician you call is certified to service your network.
- An outside service should give you a written estimate after looking at your PC.
- Watch out for avalanching repair bills, which are common with outside repair technicians. While tinkering, the urge to upgrade can be overwhelming and profitable.
- What's the warranty on the repair? Get it in writing. If the PC breaks again, will the repair be 100% free the next time? Or will you pay a fixed charge? Policies vary.

> Most PC repairs are billed in 15-minute increments. Therefore, any information you gather may cut your costs.

Investigate

Before calling for repairs, make sure you've gleaned all the clues you can about the situation.

- ▶ Take notes detailing your actions prior to the error, including print functions, logging onto the network and software run.
- ▶ Replicate the problem if the PC is operational.
- ▶ Note the exact language of every error message. If it flashes too quickly, reboot and try again.
- ▶ If the problem is erratic, start a log of everything you do and wait for it to fail again before calling.
- ▶ Isolate whether it's a software or hardware problem. Do all programs fail or just some?
- ▶ Reboot the PC with a boot disk. Can you load software or use hardware that wasn't operational before?
- ▶ Have a printed copy of the config.sys and autoexec.bat files before a problem ever occurred.
- ▶ Explain the problem on the phone. If the situation is diagnosed, it will save you a few minutes once the technician is on-site.

—Todd Henschell

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PS/2 Model 60	$450	$450
ThinkPad 300	$1,550	$1,475
PS/2 Model 95-OKF	$3,300	$2,800
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Portable III	$350	$400
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SLT-286	$650	$625
LTE-286	$700	$775
DeskPro 486/33I	$1,850	$1,800
Apple Macintosh SE	$575	$600
IICX	$1,600	$1,475
IICI	$2,250	$2,150
IIFX	$2,800	$2,400
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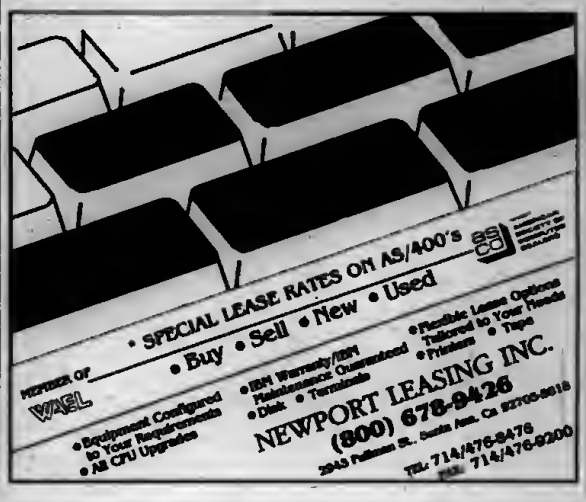

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Naperville, IL (708) 369-3000
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Laser Recording Systems, Inc.
Mountain Lakes, NJ (201) 402-9500
United Systems and Software, Inc
Maitland, FL (407) 875-2120

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Bell Atlantic Software Systems, Inc
Sudbury, MA (508) 443-7311
Expandable Software, Inc.
Santa Cruz, CA (408) 261-7880
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Rockville, MD (301) 340-5100
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Intrepid Software, Inc.
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Cleveland, OH (216) 473-3800
Man-Trak® - Management Tracking System
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Concept Systems, Inc
Philadelphia, PA (215) 563-1425
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Gateway Systems Corporation
East Lansing, MI (800) 333-9366

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Cumberland, RI (401) 333-4536
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ADD-I-ON® Software Advantage/V
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Gainers / Losers

Percent

Gainers		Losers	
Wang Labs Inc. (B)	33.3	Arr Computer Systems	-46.3
Micrografx Inc. (L)	27.0	Micron Technology	-39.8
Artel Communication Corp	23.5	Weitek	-16.0
Quarterdeck Office Sys.	21.6	Creative Technologies Inc.	-15.7
Systems Center Inc.	15.8	Sierra Semiconductor	-14.9
Telebit Corp.	13.9	PictureTel Corp	-14.4
Sequoia Systems Inc.	11.1	Conner Peripherals (L)	-14.1
Network Computing Devices	10.9	Phoenix Technologies	-13.7

Dollar

Gainers		Losers	
Matsushita Electronics	6.00	Arr Computer Systems	-9.25
SynOptics Communications	4.50	Intel Corp	-7.75
Microsoft Corp.	3.25	Newbridge Networks Corp. (H)	-5.50
Progress Software Corp.	2.25	Texas Instruments	-5.38
Sapiens USA Inc.	2.25	Micron Technology	-4.88
Analysts Int'l	2.00	Creative Technologies Inc.	-4.50
Information Resources	1.63	Micro Focus	-4.00
Systems Center Inc.	1.50	Adobe Systems Inc.	-3.75

[redacted]

IPOs stoke merger fire

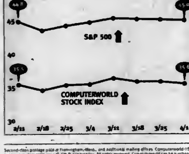
The hot initial public offering (IPO) market of the past 18 months has created a raft of middle-tier software companies looking to plug product gaps by buying smaller firms, according to Scot Sedlacek, partner at investment banking firm Broadview Associates.

IPO money will likely feed more than 200 mergers and acquisitions this year, he said. The financial goodwill stems from the fact that stockholders drove share prices up "tremendously" for firms that completed IPOs from late 1991 until now. "These companies know they can't sustain those high valuations and growth, so they have to acquire other companies with the piles of cash they're sitting on," he said.

And that is just what is happening. For example, application development vendor **Bachman Information Systems, Inc.** (BACH), which went public in November 1991, recently bought Windtunnel Software, Inc., whose PC-based application testing tool helps round out Bachman's portfolio.

Similarly, after **Frame Technology Corp.**'s (FRAM) February 1992 IPO, the company bought Datalogics, Inc., a graphics utility maker.

Many of the big names in software — **Novell, Inc.** (NOVL), **Lotus Development Corp.** (LOTS) and **Borland International, Inc.** (BORL) — started as single-product companies. And that is what investors are looking for now: strong young firms with potential runaway products. Not coincidentally, some of those same one-product firms made several acquisitions last year: Novell bought three companies, and Borland purchased two. — *Kim S. Nash*



Communications and Network Services — Off 2.2

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	35.13	9.63	3COM Corp	33.63	-1.50	-4.3
NYS	77.75	56.88	American Info Techs Corp (H)	77.75	1.25	1.6
NYS	59.13	40.13	AT&T	56.38	1.25	-2.2
OTC	3.58	0.75	Artel Communication Corp	2.63	0.50	23.5
OTC	24.50	10.75	Banyan Systems Inc	16.25	0.75	4.4
NYS	56.75	40.25	Bell Atlantic Corp	54.25	-0.38	-0.7
NYS	57.30	43.38	BellSouth Corp	55.63	0.50	0.9
NYS	6.25	3.63	Bolt, Beranek & Newman	5.00	0.13	2.6
OTC	18.50	9.75	Brooktrout Technology (L)	11.50	0.25	2.2
NYS	92.25	42.13	Cabletron Systems	87.00	0.13	0.1
OTC	34.50	17.75	Chipcom Corp	31.38	0.88	7.9
OTC	48.25	16.50	Cisco Systems Inc. (L)	42.50	3.00	-6.6
OTC	24.38	5.50	Compression Labs Inc.	9.88	1.50	-13.2
OTC	4.63	0.88	Data Switch Corp	3.94	-0.06	-1.5
NYS	22.25	13.75	Digital Comm. Assoc	15.25	-0.50	3.2
OTC	12.75	6.00	Digital Systems Int'l Inc. (L)	6.75	-0.25	-3.6
OTC	29.50	4.00	DSC Communications	26.38	-0.88	3.2
OTC	9.50	4.75	Fibronics Int'l Inc	7.13	-0.75	-9.5
OTC	33.75	9.00	FileNet Corp. (L)	9.13	-0.88	-8.8
OTC	4.38	1.50	Gandalf Technologies Inc.	3.38	0.00	0.0
OTC	2.06	0.69	Gateway Communications	1.56	0.06	4.2
NYS	11.50	2.88	General Datacomm Inds.	10.63	0.38	3.4
ASE	4.13	2.00	Go Video	2.50	-0.13	-4.8
NYS	37.75	28.88	GTE Corp	36.38	-0.25	-0.7
NYS	81.00	62.50	ITT Corp. (H)	79.88	-0.50	-0.6
OTC	46.00	29.50	MCI Communications Corp (H)	43.25	1.63	3.6
OTC	12.75	2.25	Microcom Inc.	3.50	-0.38	-9.7
OTC	24.25	4.75	Netrix Corp. (L)	5.25	0.25	5.0
OTC	19.00	9.63	Network Computing Devices	12.75	1.25	10.9
NYS	15.38	6.00	Network Equipment Tech. (L)	6.00	-0.50	-7.7
OTC	23.25	8.00	Network General	11.50	-0.63	-5.2
OTC	15.75	8.50	Network Systems Corp	9.88	-0.25	2.5
OTC	64.00	13.63	Newbridge Networks Corp (H)	57.13	5.50	-8.8
NYS	48.00	30.50	Northern Telecom Ltd	37.25	-0.75	2.0
OTC	35.25	22.50	Novell Inc.	31.00	2.25	-6.8
NYS	92.30	69.13	Nynex Corp	90.75	0.75	0.8
OTC	33.25	14.50	Octel Communications Corp	23.00	-2.00	-8.0
OTC	7.63	3.38	Penril DataComm Networks	4.31	-0.11	6.7
OTC	40.50	10.25	PictureTel Corp	17.13	-2.88	-14.4
OTC	15.75	5.75	Proteon Inc. (L)	6.13	-0.13	2.0
NYS	30.38	10.16	Scientific Atlanta Inc	23.63	0.75	-3.1
NYS	77.00	56.63	Southwestern Bell Corp (H)	76.75	0.88	1.2
NYS	31.75	20.75	Sprint Corp	29.88	1.00	3.2
OTC	27.00	8.75	Standard Microsystems Corp	17.00	-2.50	-12.8
OTC	18.50	6.88	Sysatacom Inc	11.50	1.25	9.8
OTC	95.50	18.75	SynOptics Communications	92.38	4.50	3.1
OTC	7.13	4.25	Telebit Corp	3.13	0.63	13.9
OTC	9.38	2.13	Telematics Int'l Inc	6.75	0.13	-1.8
OTC	25.50	13.38	US Robotics	18.75	-0.25	-1.3
NYS	43.88	32.88	US West Inc.	43.75	0.25	-0.6
OTC	46.00	12.00	Wellfleet Communications	40.00	3.00	7.0
OTC	22.00	7.00	Xircom	7.75	-0.25	-3.1

PC's and Workstations — Off 1.8%

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	7.25	2.75	Advanced Logic Research	3.00	0.19	6.6
OTC	65.25	41.50	Apple Computer Inc.	49.88	3.63	-6.8
OTC	24.25	11.25	AST Research Inc.	13.50	-0.25	-1.8
NYS	14.63	4.75	Commodore Int'l	5.00	0.00	0.0
NYS	58.50	22.25	Compaq Computer Corp	46.88	3.25	-6.5
OTC	49.88	15.00	Dell Computer Corp.	32.88	3.50	9.6
NYS	82.88	50.25	Hewlett Packard Co.	73.13	-0.50	-0.7
NYS	33.00	14.13	Silicon Graphics	26.00	1.63	5.9
OTC	41.00	22.50	Sun Microsystems Inc.	28.88	0.50	1.8
NYS	32.13	22.25	Tandy Corp	29.50	1.50	5.4
OTC	15.25	2.75	Zeos International Ltd	4.88	-0.13	-2.5

Large Systems — Up 0.6%

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
ASE	10.38	6.00	Amdahl Corp. (L)	6.13	0.25	3.9
NYS	11.63	4.75	Convex Computer	5.38	0.00	0.0
OTC	6.13	1.88	Cray Computer	3.00	-0.19	5.9
NYS	41.00	19.00	Cray Research Inc.	27.38	-0.13	0.5
NYS	13.88	7.13	Data General Corp.	11.50	-1.00	0.0
NYS	54.88	30.38	Digital Equipment Corp	42.88	-3.38	7.3
NYS	38.63	26.63	Harris Corp	36.88	-1.25	3.3
NYS	100.38	45.88	IBM	52.63	1.38	2.7
OTC	22.00	5.50	Kendall Square Research	16.00	0.00	0.0
NYS	130.00	83.00	Matsushita Electronics	108.50	6.00	5.9
OTC	17.00	6.00	Pyramid Technology	13.50	-1.00	-6.9
OTC	24.00	11.13	Sequent Computer Sys.	18.25	0.38	2.1
OTC	16.38	1.38	Sequoia Systems Inc	2.50	0.25	11.1
NYS	49.50	25.50	Stratus Computer Inc	35.75	0.63	1.8
NYS	38.88	9.88	Tandem Computers Inc	11.63	-1.00	-7.9
NYS	13.88	7.75	Unisys Corp	12.88	-0.38	2.8
ASE	5.38	0.06	Wang Labs Inc. (B)	0.50	0.13	33.3

Software — Off 3.5%

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	54.25	25.25	Adobe Systems Inc.	40.75	3.75	8.4
OTC	26.50	10.25	Aldus Corp	18.75	0.25	1.4
OTC	16.63	5.63	American Software Inc.	7.00	-0.25	3.4
OTC	20.13	9.75	Arr Computer Systems	10.75	9.25	-46.3
OTC	56.50	27.75	Autodesk Inc	41.63	0.63	1.5
OTC	23.00	3.50	Bachman Info. Systems	3.69	0.06	1.7
OTC	43.00	34.50	BGS Systems Inc	39.00	0.75	-1.9
OTC	84.13	37.25	BMC Software Inc.	44.50	-3.50	-7.3
OTC	28.75	17.00	Boole & Babbage	27.25	0.00	0.0
OTC	55.75	17.50	Borland Int'l Inc.	20.00	2.75	12.1
OTC	7.13	3.00	CE Software	3.75	-0.13	3.2
ASE	35.00	9.38	Cheyenne Software Inc.	30.13	0.63	2.1
OTC	19.50	8.25	ChipSoft	10.50	1.50	-12.5
OTC	9.75	5.63	Cognos Inc.	6.63	0.00	0.0
NYS	27.38	10.88	Computer Associates	23.00	1.50	6.1
NYS	12.38	4.00	Computervision Corp	4.75	-0.75	-5.0
OTC	34.25	24.00	Compuware Corp	26.75	1.50	5.3
OTC	17.00	6.75	Comshare Inc	7.38	-0.63	-7.8
OTC	17.25	10.75	Corel Corp	15.00	0.25	1.7
OTC	33.25	6.00	Easel Corp	9.50	0.00	0.0
OTC	25.25	12.00	6th Dimension	22.00	0.25	-1.1
OTC	24.00	7.25	Frame Technology (L)	7.75	0.25	3.1
OTC	20.75	12.50	Group I Software	14.00	1.00	-6.7
OTC	35.25	21.00	Gupta (L)	22.75	1.13	-4.7
OTC	8.75	3.50	Hogan Systems Inc	6.88	0.13	1.8
OTC	25.75	12.25	IMRS	14.00	-0.75	-5.1
OTC	34.75	18.50	Information Resources	29.13	1.63	5.9
OTC	42.00	12.13	Informix Corp.	32.00	2.25	-6.6
OTC	38.75	11.00	Intergraph Corp	11.50	-0.50	-4.2
OTC	13.63	7.75	Interleaf Inc.	9.00	-0.63	-6.5

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	18.00	7.00	Intersolv Inc.	7.00	-0.50	-6.7
OTC	17.50	9.25	Knowledgeware Inc	10.00	-0.13	1.2
OTC	54.75	28.75	Legent Corp	37.50	-3.00	-7.4
OTC	35.30	14.75	Lotus Development	24.75	-2.50	-9.2
OTC	23.00	12.63	MathSoft (L)	12.63	-1.63	-11.4
OTC	23.75	5.50	McAfee Associates	5.63	-0.88	13.5
OTC	10.50	1.88	Meca Software (H)	9.00	-0.63	-6.5
OTC	16.30	5.25	Mentor Graphics	9.00	-0.50	-5.3
OTC	46.00	27.25	Micro Focus	31.50	-4.00	-11.3
OTC	20.50	4.50	Micrografx Inc. (L)	5.88	1.25	77.0
OTC	95.00	65.50	Microsoft Corp.	89.75	3.25	3.8
OTC	37.50	12.00	Oracle Corp (H)	34.88	-1.25	-4.8
OTC	31.88	13.25	Parametric Technology	28.00	-1.25	-4.3
OTC	40.50	22.50	Peoplesoft	31.88	-1.13	-3.6
OTC	10.25	3.50	Phoenix Technologies	4.31	-0.69	13.7
OTC	40.00	29.00	Powersoft	30.25	-2.00	-6.2
OTC	25.00	11.25	Platinum Technology	14.13	-0.38	2.6
OTC	61.30	29.00	Progress Software Corp	45.75	2.25	5.2
OTC	18.63	2.94	Quarterdeck Office Sys.	3.88	0.69	23.5
OTC	24.50	11.75	Rainbow Technologies Inc.	20.00	1.50	8.1
OTC	21.25	4.00	Rasterops	5.88	-0.88	-13.0
OTC	15.25	3.63	Ross Systems (H)	13.25	1.50	10.2
OTC	27.25	8.50	Sapiens USA Inc	24.00	2.25	10.3
OTC	20.25	6.75	Software Publishing Corp	13.88	1.38	9.6
OTC	9.13	2.00	Software Toolworks Inc	7.38	-0.38	-4.8
OTC	4.88	0.75	Spinnaker Software	3.94	-0.33	-6.1
OTC	14.75	3.25	State of the Art	11.00	0.00	0.0
NYS	24.63	13.75	Sterling Software Inc.	22.13	1.88	-7.8
OTC	19.30	8.00	Struct. Dynamics Research	15.00	-1.63	-9.8
OTC	62.25	23.00	Sybase Inc.	56.00	-1.00	-1.8
OTC	47.50	5.88	Symantec Corp	12.63	0.63	5.2
NYS	12.88	5.25	Systems Center Inc.	11.00	1.50	15.8
OTC	25.50	18.88	System Software Assoc.	12.75	0.25	2.0
OTC	8.88	2.50	TSR Inc?	4.13	-0.38	-8.3
OTC	22.75	9.13	ViewLogic Systems	15.50	-0.75	-4.6
OTC	23.30	7.25	Walker Interactive Systems	7.50	-0.63	9.1
OTC	4.25	1.38	Wordstar	2.25	-0.25	-10.0

Semiconductors — Off 6.5

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
NYS	24.50	7.38	Advanced Micro Devices	21.25	-1.50	-6.6
NYS	21.25	9.00	Analog Devices Inc (H)	19.38	-1.63	-7.7
OTC	20.13	7.63	Atmel Corp.	17.13	-0.88	-4.9
OTC	9.63	3.13	Chips and Technologies	5.75	0.13	3.6
OTC	39.75	16.75	Cirrus Logic	23.88	-2.50	9.5
NYS	14.25	7.38	Cypress Semiconductor Corp	9.50	-1.00	9.5
NYS	16.13	7.00	Dallas Semiconductor	14.38	-0.75	-5.0
OTC	121.25	46.50	Intel Corp.	107.50	-7.25	-6.7
NYS	14.13	4.88	LSI Logic Corp.	11.75	-0.75	-6.0
NYS	28.30	12.88	Micron Technology	19.75	4.88	19.8
NYS	67.00	36.66	Motorola Inc. (H)	63.13	-2.25	3.4
NYS	14.13	8.25	National Semiconductor	12.50	-0.25	-2.0
OTC	21.25	8.25	Sierra Semiconductor	10.00	1.25	-16.9
OTC	38.50	22.25	SynOpsys	32.75	0.75	2.3
NYS	63.38	31.50	Texas Instruments	53.63	-5.38	-9.1
OTC	9.13	6.00	VLSI Technology	6.75	-0.13	-1.8
OTC	7.63	2.13	Weitek	5.25	-1.00	16.0
ASE	9.63	3.50	Western Digital Corp	5.13	-0.38	-6.8
OTC	37.50	14.50	Xilinx	31.50	-3.50	10.0
OTC	27.84	12.50	Zilog Inc.	24.00	1.00	4.3

Peripherals and Subsystems — Off 3.5%

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	32.88	10.38	American Power Conversion (H)	29.50	-0.38	-1.3
OTC	20.16	13.66	BancTec Inc.	17.13	0.63	-3.8
OTC	18.00	9.25	Cambex Corp	10.30	-0.50	-4.5
ASE	18.38	7.38	Cognitronics Corp	7.75	-0.38	-4.6
NYS	25.50	13.75	Conner Peripherals (L)	13.75	-2.25	-14.1
OTC	38.50	10.75	Creative Technologies Inc.	24.13	-4.50	-15.7
OTC	30.75	14.25	Data Race Inc.	19.25	0.25	1.3
ASE	10.88	4.75	Dataram Corp	8.75	0.13	1.4
NYS	28.75	7.25	EMC Corp.	24.25	0.38	1.6
OTC	10.50	5.38	Emulex Corp	6.75	-0.25	-3.6
OTC	19.00	13.25	Evans & Sutherland	15.50	-1.25	-7.5
OTC	39.25	12.00	Exabyte	14.50	0.00	0.0
OTC	26.00	7.09	Intelligent Info. Systems	20.00	-1.63	-7.5
OTC	8.88	3.88	Iomega Corp.	4.50	-0.38	-7.7
OTC	31.00	5.75	IPL Systems Inc.	6.30	-0.50	-7.1
OTC	24.00	10.75	Komag Inc.	18.38	2.50	-12.0
OTC	19.63	6.88	Maxtor Corp	7.63	-0.38	-4.7
OTC	12.38	6.50	Micropolis Corp.	6.30	-0.38	-5.5
NYS	131.25	85.50	3M Corp (H)	109.75	-0.50	-0.5
OTC	7.25	4.00	Printronix Inc.	7.38	0.38	5.4
NYS	17.13	6.88	QMS Inc.	14.38	-0.63	-4.2
OTC	17.88	12.13	Quantum Corp	12.13	-1.30	-11.0
OTC	12.75	3.30	Radius Inc. (L)	3.75	-0.13	-3.2
NYS	16.25	7.50	Recognition Equipment	13.38	1.00	8.1
OTC	13.88	5.50	SBE Inc.	6.25	0.50	8.7
OTC	22.38	12.00	Seagate Technology	14.25	0.50	-3.3
NYS	64.00	18.00	Storage Technology	23.63	-2.00	-7.8
NYS	27.63	16.88	Tektronix Inc. (H)	26.13	-1.00	-3.7
NYS	88.88	66.75	Xerox Corp	80.88	2.88	-3.4

Services — Off 1.3

Exch	52-Week Range			April 2 3pm	Wk Net Change	Wk Pct Change
OTC	23.50	12.38	American Mgmt. Systems	22.13	0.25	1.1
NYS	5.00	3.00	Anacomp Inc.	3.75	-0.25	-6.3
OTC	35.75	16.00	Analysts Int'l	29.50	2.00	7.3
NYS	56.13	38.75	Auto Data Processing	57.25	-0.13	-0.2
NYS	17.25	9.41	Ceridian Corp.	15.38	0.38	3.4
NYS	17.38	12.50	Comdisco Inc.	15.88	-0.63	3.8
OTC	13.00	6.75	Computer Horizons	10.50	0.00	0.0
NYS	80.30	57.00	Computer Sciences	26.00	3.50	-4.4
NYS	9.75	7.00	Computer Task Group	7.38	0.00	0.0
NYS	40.30	22.00	CompUSA Inc.	30.25	-0.75	-2.4
OTC	17.50	6.00	Corporate Software	13.13	-0.13	-0.9
OTC	28.00	7.63	Egghead Discount Software	7.88	0.00	0.0
NYS	35.88	25.25	General Motors E (EDS)	32.00	1.50	4.9
OTC	25.50	9.25	Inacom Corp.	19.25	0.38	2.0
OTC	15.75	6.75	Intelligent Electronics	13.50	-0.75	-5.3
OTC	14.38	6.63	Merisel	11.38	-0.63	5.2
OTC	13.25	8.75	Microage Inc. (H)	13.50	0.50	3.8
OTC	42.00	31.75	Paychex	41.25	0.13	0.3
NYS	86.88	59.75	Policy Management Sys.	84.75	1.25	1.5
NYS	35.38	16.81	Reynolds and Reynolds	33.30	-0.63	-1.8
OTC	31.75	22.00	SEI Corp	27.75	-2.25	7.5
OTC	24.38	16.88	Shared Medical Systems	21.38	0.00	0.0
OTC	14.38	5.75	SHL Systemhouse	10.98	0.13	1.2
OTC	29.25	18.25	Software Spectrum Inc.	22.25	-1.50	-6.3
OTC	33.75	21.00	SunGard Data Systems	30.75	-0.63	-2.0
NYS	4.00	1.13	Ultimate Corp. (H)	3.50	-0.38	-9.7

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1993 by CW Publishing/Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $6.00 a copy; U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

Interview

James Goodnight

Face to Face

SAS Institute founder says customer focus has kept company on top all these years

Q. SAS has made the transition from mainframe to client/server vendor better than most companies. What did you do differently?

A. We've been driven by our customers. We used to be MVS only until customers asked us to get onto CMS and then onto VAXs. We have a yearly software ballot we send to our users, and our tech support staff tracks what users are saying all year long. When we moved to PCs in 1984, we decided to rewrite the entire system from the ground [up] to be portable across platforms. So only 10% of the code on any machine has been written for that machine.

Q. What are the biggest mistakes you have made?

A. Not being able to move slightly faster to release systems that are on the cutting edge. But it hasn't hurt us too badly. Our revenues were up 27% this past year, and they're looking very good again this year.

Q. Does your past as a statistical software company cause you any problems trying to make the transition to the general information delivery business?

A. Just look at the product counts. We've got 5,800 base products under MVS, but only 2,300 of those are stat products. Stat is just one of over 20 modules that make up the SAS system.

Q. Does it ever hurt you getting in tha door?

A. Well, we're in most doors already. We've got nearly all the Fortune 1,000.

Q. How have you maintained such devoted user groups?

A. I'm not sure we've done anything in particular except for our SASware [user wish list] ballot and working with the groups to provide logistical support.

The decisions about what's going to be said at the user group meetings are made by the users. They decide the program content.

Our user group meetings are never unfriendly. We've always had a lot of new things to show them.

SAS' James Goodnight is surprised by the continued success of the company's mainframe products, which contribute 80% of SAS revenue.

Q. The software industry is under pricing pressure right now. Your users have sometimes complained that your prices are high.

A. We've never had a lot of complaints about our tiered price structure. We will negotiate large site license contracts if companies will make SAS a strategic information delivery system.

And so much of our revenue goes back into research and development, which is what users want us to spend our money on.

Q. Your mainframe revenue grew 19% last year. What is going to happen to that business in the future?

A. I keep thinking it's going to slow down someday because I really want the desktop products to be a larger percentage of revenue. We're still getting almost 80% of our revenues from mainframes and minis. As everyone has quit supplying software to the mainframe market, we may have a market to ourselves soon. We've got a helluva lot of products out there on Unix and the desktop; we just don't charge a lot for them.

Q. Why do you continue to take an active role in programming your own products? You still are the primary programmer on FSEdit.

A. I enjoy it. As a programmer I have the same frustrations and problems that our developers do. I've actually given away a lot of the products I used to maintain to other people. I'm down to just one.

Q. You were recently quoted as saying you want to be THE information delivery system for an organization. But that puts you against database vendors that are in a stronger position.

A. I disagree. They don't have the analytical tools that we have. It seems like everybody who bought a Unix box went out the next day and bought a database because it seems like we're having to interface with every database around. But now we can read and write many databases, so you've got the analytical power of SAS and your data doesn't just sit there.

Q. What do you think Windows NT's prospects are?

A. I think it will fairly quickly replace Windows entirely. This is an operating system we should have had four years ago instead of the mess that IBM and Microsoft created for their users. They should have gone from PC-DOS to a 32-bit operating system. Instead, they went to 16-bit OS/2.

Q. You were pretty critical of object-oriented programming recently. Why?

A. I wasn't that critical. All of our new EIS and frame-technology products are object-oriented. But are you going to abandon C and write everything in object-oriented code? I don't see that as a panacea.

A system like the SAS System, with 25,000 different files — if they all had to talk to each other before the system fired up, it'd be a year before you saw the first screen.

We've had subroutine libraries for years that have done the same thing as objects.

Q. Is there any kind of management philosophy that has served you especially well?

A. Yes: Hire very bright people, have good independent managers and leave me alone to program.

Interview by Paul Gillin, *Computerworld*'s executive editor. His MCI Mail address is 575-4120.

Wysiwyg

Hal Mayforth

The World of E-Mail

Get the message

At my last place of employment, the unwritten rule was: If you drink the last of the coffee, make a fresh pot. Unfortunately, not many people did. In response, an angry coffee drinker sent a raging five-page E-mail message regarding his dissatisfaction. The message was so long and went to so many people, it used all the memory of at least one disk, and no one could access their E-mail messages. — *John Beamish, senior systems analyst, Ministry of Education, Toronto*

Misfired message

An employee sent a confidential E-mail message regarding a water cooler to her manager, stating that every time she drank from it, she got "the runs." Instead of sending it to her manager, however, it went to a group of over 200 users in the company.

— *Tracy Mitchell, network training and support specialist, WHDH-TV, Boston*

GREAT NAMES

BILL GATES, DATABASE ADMINISTRATOR, OFFICE OF THE TREASURY, MINISTRY OF TREASURY AND ECONOMICS, TORONTO

QUIPS & QUOTES

Butler W. Lampson, recent winner of the prestigious A.M. Turing Award from the Association for Computing Machinery for his work at Xerox's Palo Alto Research Center in the '70s and '80s, defines distributed systems this way:

"A distributed system is a system in which I can't get my work done because a computer has failed that I've never even heard of."

The Fifth Wave *by* Rich Tennant

"THE SYSTEM CAME BUNDLED WITH A GRAPHICS BOARD, A SPREADSHEET AND THE DEVELOPER'S OUT-OF-WORK NEPHEW."

Inside Lines

What's that buzz?

Bulletin board users are being warned about a bug in MS-DOS 5.0 that can wipe out part of the hard disk. The bug only affects disks with capacities of 127M bytes to 129M bytes, 254M bytes to 258M bytes, 508M bytes to 516M bytes, 1,018M bytes to 1,030M bytes and 2,034M bytes to 2,061M bytes. The problem occurs when using the UNDELETE/ALL, CHKDSK/F functions. The /F and /ALL switches activate the fixoptions in order to alter errors in the file allocation table (FAT) and recover lost units. When CHKDSK or UNDELETE are run, they write 256 copies of the FAT all over the root directory, making data recovery almost impossible.

Open, sesame . . .

After a year of false starts and delays, Hitachi Data Systems is expected this week to announce the Osiris family of products for the open systems market. An implementation of the Open Software Foundation's OSF/1 operating system and a network coprocessor will be included. Targets include large companies that want to integrate open systems with their traditional IBM System/370 mainframes. Future plans include porting Oracle's database management system and a high-speed network data manager being developed with Epoch Systems.

Alive and kicking

While the noise and excitement around Microsoft's Windows NT has been nearly overwhelming, contrary to rumors, VMS is not dead yet. DEC will this week announce new versions of its VMS operating system with planned 64-bit addressing for files and databases and, ultimately, full 64-bit support, according to industry sources. The operating system will also be more modular.

Covering all the bases

Win32 and Win32S APIs from Microsoft will be joined by a third in the near future. According to sources at Microsoft, Win32C will be an API designed to run on "medium-level" hardware, but it will also support multithreading and preemptive multitasking in addition to Win32S' 32-bit memory addressing. It will lack such features as the security API found in Win32, however. The new API appears to be aimed at applications developed for Microsoft's next-generation Windows-on-DOS product, code-named Chicago.

Control freaks

Numerous sources report that Microsoft intends to control the operating system in the personal digital assistant environment. They say Microsoft is working on a new, pen-centric version of Windows, called WinPad, that will abandon DOS entirely but maintain the Windows API. Microsoft is mum about the project.

AppleScript out the door

Rolling out at this week's Apple Enterprise Computing Conference in San Francisco will be Apple's long-awaited AppleScript, a System 7 software extension designed to allow tight interapplication communications.

Revolving door spins at Compaq

Compaq is saying little about the recent loss of four sales executives, including Dave Davis, vice president of North American sales. The company is known to be examining a restructuring of its field sales group, which currently operates largely as a reseller support organization, and the loss of these four people could signal a new Compaq sales model for the 1990s.

TII, Inc., a Santa Clara, Calif., software vendor, has announced that the first commercial copy of its WeddingWorks for Windows wedding planning package will be delivered to Microsoft President Bill Gates. Gates will receive the package for free because "Bill's budget is likely to get strained in the months prior to the wedding," said a TII press release. If you know of any big plans, phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's *24-hour voicemail tip line at (508) 820-8555.*

The complex steps you must follow to add Wyse terminals to your DEC environment.

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2. Play.

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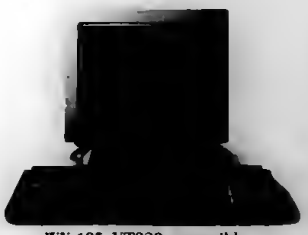
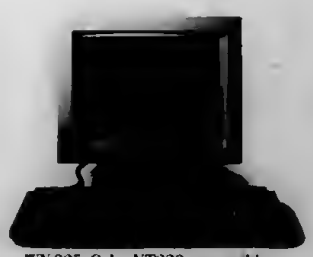


WY-185. VT320 compatible.

WY-370. Color VT320 compatible.



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WYSE

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